

BRITISH DIVING DUCKS

BY

J. G. MILLAIS

VOL. I

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BRITISH DIVING DUCKS

VOL. I

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LONG-TAILED DUCK (WINTER)
adult male and female

BRITISH DIVING DUCKS

BY

J. G. MILLAIS, F.Z.S., M.B.O.U., ETC.

AUTHOR OF "THE MAMMALS OF GREAT BRITAIN AND IRELAND," "NEWFOUNDLAND
AND ITS UNTRODDEN WAYS," "THE NATURAL HISTORY OF BRITISH SURFACE-
FEEDING DUCKS," "THE WILD-FOWLER IN SCOTLAND," "THE NATURAL
HISTORY OF BRITISH GAME-BIRDS," ETC.

VOL. I

WITH THIRTY-TWO PLATES (TWENTY-TWO OF WHICH ARE COLOURED)
BY ARCHIBALD THORBURN, O. MURRAY DIXON, H. GRÖNVOLD
AND THE AUTHOR

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To

His Most Gracious Majesty King George V.

INTRODUCTION

IN writing this monograph on the British Diving Ducks I have attempted to set forth the life-history of certain birds belonging to the Palæarctic region, which are without exception the most difficult to study. The majority of the species described do not breed with us, and to gain a knowledge of their habits and the various plumages through which they pass from birth to maturity has involved much labour, travel, and collecting. When I began the task of studying the ducks, some thirty years ago, I found few books or collections that were of much help, and even to-day the best public and private museums seldom contain more than a few specimens besides the adults. It was therefore necessary to personally form such a collection as would show beyond question the various changes, often intricate and slow, through which the ducks pass during life, and, with this end in view, I spent many years shooting ducks on the British coasts. After a time it was found impossible to obtain more than a certain number in our islands, and I had to go far afield to Iceland, Scandinavia, East and West Canada, Alaska, Southern Europe, and North Africa, that I might obtain such ducks in various plumages as were unobtainable at home. Thus most of the birds here figured were shot or collected by myself, and if this book contains no other merit, it will show for the first time a fairly complete series of pictures of the life-history of each of our ducks. This has not been previously offered by any author, and it will, I trust, be of use to those lovers of Natural History who are anxious to study these interesting birds.

Naumann and Blasius (in the *Neuer Naumann*) have given us some good descriptions of such diving ducks as came under their notice, but their collection and the birds at their disposal seem to have been few in number, so that they often fail to tell us the exact ages of the specimens they describe. Moreover, there are

no pictures of special interest to help the descriptions, except some interesting ones of eclipse plumages. Mr. Booth, too, in his excellent *Rough Notes*, gives us some pictures of immatures, but they are also few in number, and do not deal with the rarer species. Of recent years I have discovered only one collection which contains many specimens of rare Arctic and Palæarctic ducks. This belongs to Mr. E. Lehn Schiöler, of Copenhagen, and I cannot thank him too sincerely for the generous way in which he has placed his specimens at my disposal. When he found another ornithologist as anxious as himself to unravel the tangled skein of duck life, he immediately extended the hand of welcome, and lent to me any birds I required to fill the missing gaps. Thus I was able to complete my series without further search. As an instance of Mr. Schiöler's thoroughness, I may state that on asking to see Eiders and King-Eiders, he at once produced eleven hundred specimens of these birds, which took us three days to examine. Another ornithologist to whom I owe a debt of gratitude is Rev. F. C. R. Jourdain, whose knowledge of the local distribution and the nests and eggs of European birds is second to none in Europe. He has most kindly given me many valuable notes on migration and the breeding habits and distribution of our ducks, as well as exact measurements of their eggs, and has saved me much work in the examination of Continental records.

I am also grateful to the following friends for many useful notes and observations: the Hon. Gerald Legge, Lord William Percy, Mr. Maurice Portal, Mr. Heatley Noble, Mr. H. St. Quintin, and Mr. Hugh Wormald. These are all men gifted with unusual powers of observation, whose records we can trust, and whose opportunities for studying ducks have been exceptional. Some of them have been my regular correspondents for many years, and all are imbued with a great love of ducks, so that if I can make these volumes acceptable to all such serious students of this subject I shall be very happy.

Mr. Archibald Thorburn has again assisted me in the illustrations, and, with his usual skill and thoroughness, has achieved some remarkable work. Especial care has been taken in depicting the "soft" parts of the birds, as well as the natural surroundings of each species, and without this we cannot hope to have accuracy. Every drawing by Mr. Thorburn is a finished unit, perfect alike in harmony of colour and accuracy of drawing, and I trust that my readers will appreciate the

“Frisch” reproductions. Mr. Grönvold and Mr. Murray Dixon, too, have made excellent drawings of the eggs, the young in down, and eclipse plumages.

After carefully studying all the old and the new lists of British birds and their nomenclature, I have adopted those names which seem best to me, a course all working ornithologists will probably follow till the end of the chapter. I have always thought that there are too many genera amongst the ducks, and I have accordingly discarded those that are superfluous.

J. G. MILLAIS.

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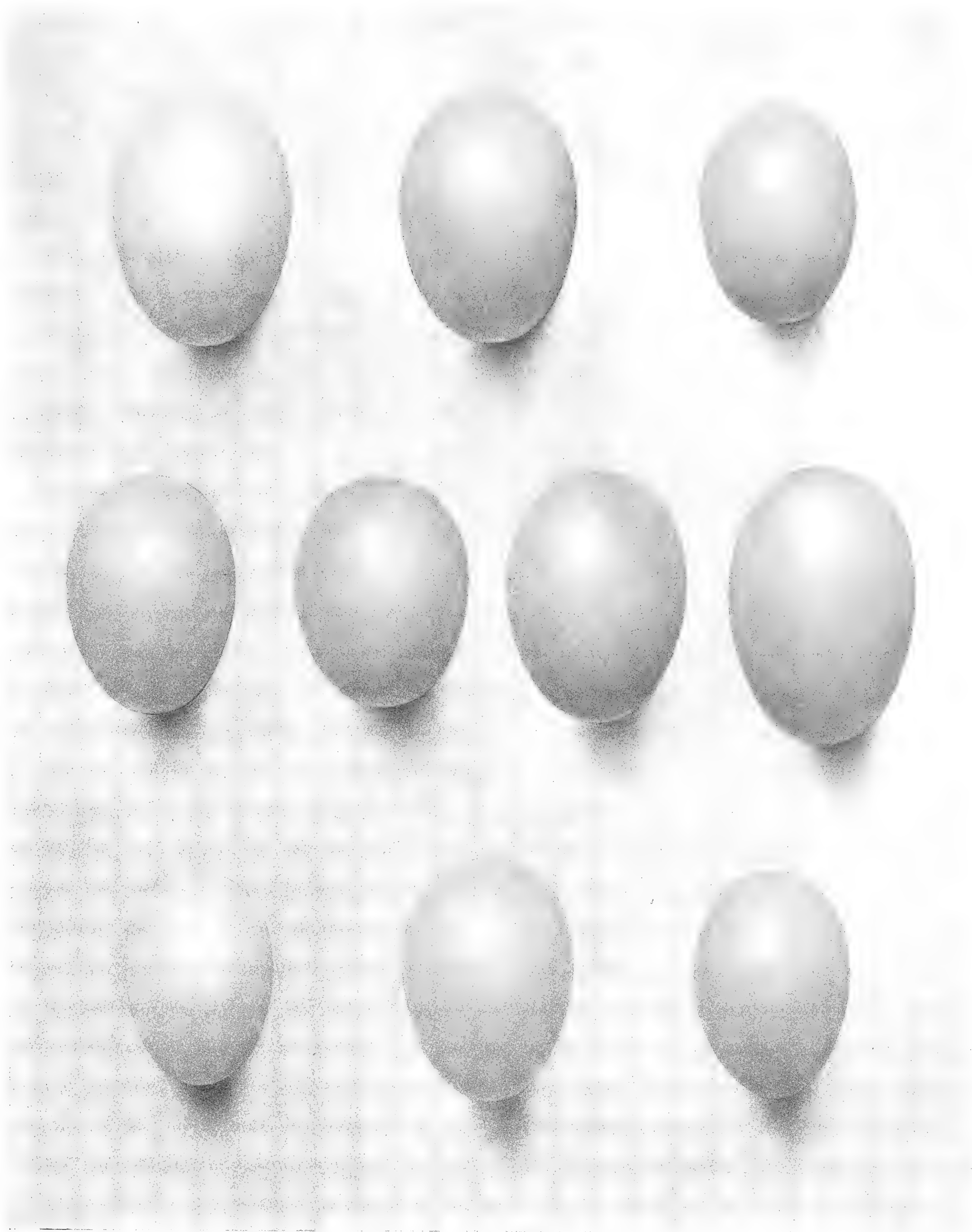
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H. Grönwald, pinx.

EGGS OF BRITISH DIVING DUCKS.

- | | | |
|-------------------------|--------------------|-------------------------|
| 1. Red-crested Pochard. | 2. Common Pochard. | 3. Ferruginous Duck. |
| 4. Tufted Duck. | 5. Golden-eye. | 6. Barrow's Golden-eye. |
| 7. Scaup Duck. | | |
| 8. Buffle-headed Duck. | 9. Harlequin Duck. | 10. Long-tailed Duck. |

BRITISH DIVING DUCKS

FAMILY : *ANATIDÆ*

IN the first volume of this series of books dealing with the life histories of certain groups of British birds, I treated the Surface-feeding Ducks. In these two volumes I have endeavoured to describe the Diving Ducks that stay with us, or are merely winter visitors. The Diving Ducks are characterised by their large and lobed hind-toes. They have thick heads and short necks, somewhat broad and clumsy bodies, whilst the legs lie rather far back towards the extremity of the body. The wings are somewhat shorter than those of Surface-feeding Ducks, and more arched, whilst the feathers of the wings and tail are closer. Broadly speaking, the ducks of this group dive for their food, and prefer, as a rule, deeper water and more exposed situations than the Surface-feeders, but some species also tip up the body to reach their food in water too shallow for immersion. With the possible exception of the Harlequin, they walk badly, and if hurried, with heavy waddling or erect body. All the members of the group fly swiftly, but those with heavy bodies, such as the Eiders and the Velvet Scoter, are disinclined to rise, and have some difficulty in doing so except in a strong wind. When swimming the body is sunk rather deeply in the water, so that only a strip of the flank feathers which overlap the wings are visible above the surface, whilst the tail generally trails in the water. The short and broad tail is stiff and resilient, with the ends often worn owing to the rubbing it receives on the bottom of the lakes, rivers, and sea. As a rule Diving Ducks do not pursue fish or water creatures for any great distance under the surface, as Grebes and Divers do, but rather select food that is stationary on the bottom or directly in their course. They can remain under water for one minute or even more, and for the most part swallow all their food under water in the place where it is found, although sometimes they will bring large substances to the surface, and here break them up or complete the action of swallowing. Unless hurried, frightened, or wounded, most of the species propel themselves under water solely with the feet, but several of them half-open the wings, whilst the Eider often "flies" with its wings under water, using its feet as well. This I have myself seen many times. Most of the Diving Ducks dive and proceed directly against the current down to the feeding spot, but the common Golden-Eye, and probably all the species of *Clangula*, work down to the bottom in spiral curves where the water is at all deep.

The calls uttered by Diving Ducks are very different, in the case of the males, from those emitted by the Surface-feeding Ducks. Most of the females utter a hoarse guttural croak instead of a "quack," whilst the males have each distinct notes which are separately described when dealing with the different species. They feed on small fish, water insects, mussels, crabs, snails, worms, or on the sprouts, seeds, and buds of various water plants. For the most part they affect the sea, often far from land, and may breed close to the salt water,

or on lakes or rivers near the sea, whilst some nest on the freshwater rivers and lakes. The eggs are generally somewhat shorter and thicker than those of Surface-feeding Ducks, and the young show a greater aptitude at diving. The flesh has an oily and rancid taste, and the down is useful for many purposes.

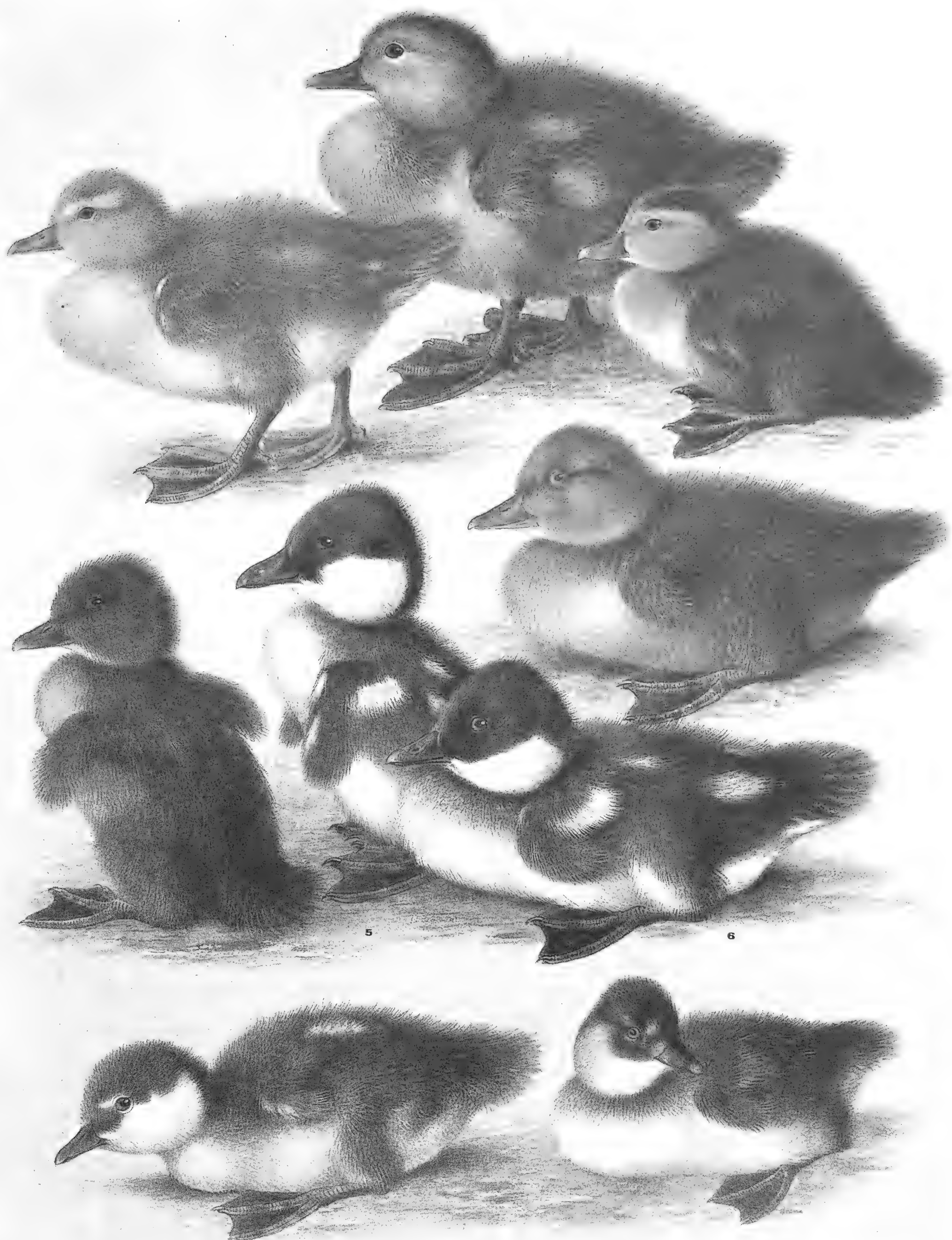
The period at which the Diving Ducks become adult varies considerably, some, such as the Pochard, being adult and capable of breeding in their first spring, whilst others, like the Eiders, take years to acquire their full dress; but as each species is separately treated, and its whole change of plumage from birth to maturity explained in detail, I need say no more in this place. The marvellous colour-changes which I first explained and described¹ in the Surface-feeding Ducks, as being found in that group of birds, are only slightly to be seen in the Diving Ducks, and none of them when changing their feathers show anything like the sympathetic changes which undoubtedly take place in the case of the Mallard and the Wigeon.

This is not perhaps the place to introduce controversial matter, but I have been severely criticised by my friends of the British Ornithologists' Union (the majority of whom have never taken the trouble to obtain a large series of Mallard and Wigeon in life and immediately after death and examine them carefully), who do not accept my views that a feather once developed can change colour or alter its pattern. They adhere to the old theory that once complete a feather is so much "dead" structure, and can only change by abrasion at the tip and by fading. The fact remains, however, that feathers, especially in the case of the two above-mentioned Ducks, when passing from spring to eclipse and eclipse into winter dress, do change colour as well as fade, and I have exhibited and figured feathers that are beyond question what I have asserted them to be—(1) Old feathers of one colour and of the old spring dress changing in the last few days of their attachment to the bird to a totally different colour and pattern in sympathy and alike to the feathers of the incoming plumage of the eclipse; and (2) new feathers of the winter plumage coming in fresh with markings of the old eclipse plumage which soon disappear and become as full winter feathers; (3) feathers of the eclipse plumage itself altering, both by fading and colour change, in sympathy with the old spring plumage that is past and with the new winter plumage that is to come.

In cases of old feathers changing colour, such as the bronze-purple ones on a Mallard's head, which often change to black spot with light edges, it may be argued that these colours are *underlying* the old and brilliant colours of spring, and to a great extent this is the case, but such a contention cannot be advanced in the case of certain feathers on the scapulars of the Wigeon, which are new and come in half winter, grey and vermiculated, and half eclipse, rich black and chestnut. These feathers are not again moulted, but change to all grey with vermiculations in a few weeks by colour change.

My friend Mr. P. W. Pycraft, who, as a careful biologist, has given particular attention to the structure of feathers, has approached this difficult subject with unbiassed mind, and the result of his investigations points to the fact that after the feather is once developed it cannot change colour or alter its pattern, because there is no visible means of colour transmission. Microscopic examination on his part has failed to show that there are any channels by which colour or "life" can be passed up the quill and the *Rami*, and from this

¹ *The Natural History of the British Surface-feeding Ducks.*



YOUNG OF BRITISH DIVING DUCKS.

- | | | |
|--------------------|----------------------------|--|
| 1. Common Pochard. | 2. Red-crested Pochard. | 3. Ferruginous Duck. |
| 4. Tufted Duck. | 5. Golden-eye, toes, buff. | 6. Barrow's Golden-eye, toes, greyish green. |
| 7. Scaup Duck. | 8. Harlequin Duck. | 9. Long-tailed Duck. |

he argues that a feather is so much dead structure. On the other hand, he has admitted to me that his microscope is not a very powerful one, and that it is possible there might be some mode of transference too small for the eye of any glass, except one of extraordinary power, to detect.

With regard to the actual colour and pattern changes, not necessarily due to a fresh *rise* of colour, which I have asserted do take place, I am glad to have the support of several field and scientific naturalists whose observations and opinions I most value because they are each and all Duck specialists, and they have sent me many (unsolicited) letters in corroboration of my views. Mr. Wormald, the Honourable Gerald Legge, Lord William Percy, Lewis Bonhote, Mr. E. Lehn Schiöler, are all quite satisfied on this point. I only quote one letter from the last-named ornithologist, who has devoted a life to the study of Ducks.

"My collection of those ducks (I have 200 *M. penelope* and 300 to 400 *Anas boschas*) is especially rich in eclipse plumages, and, as you say, this plumage shows wonderful colour changes. I, for my part, have no doubt but your views are correct, but how are we to *understand* the meaning of these changes? I can quite well understand those who hold the opinion that, once full grown, a feather cannot change, but at the same time it seems to me a weak point to wish to prove that which cannot take place when it does do so.

"I, for my part, believe that colour changes in feathers are to a large extent due to wear of a part or of the whole feather. Not only the tops but the *surfaces* are removed to give place to a new colour and pattern. Many diverse birds such as Redpolls, Dunlins, &c.¹ do this, but certain it is that colour and pattern change do take place, and it is impossible to any one who has accustomed his eye to look upon those things to deny the fact, if a man takes the trouble to skin his specimens himself."

This "wearing" of the whole surface so as to disclose the underlying new pattern and colour of say the spotted feathers or the cheeks of the Mallard Drake, which appear just before they are shed in late June, is one form of colour change. But it does not explain the remarkable "rise" of colour that comes with the curly feathers of the tail in August. These feathers (which are only renewed once in the year) come in rich brown with a black centre. So they remain for a short period, but later in September, as they elongate and curl, they begin to turn black, until by the end of the month they are jet-black. A rise of colour must therefore be in course of movement the whole period as the feather elongates, and must prove that there is a means of transmission either through veins or pigment cells of infinitesimal size. Any naturalist can prove these two points by keeping a Mallard Drake or two alive and examining them daily from June to September, but so far my opponents have remained blind to these facts.

It has always seemed to me that Ducks are divided into too many genera, and that several which only show trifling differences of character from those nearest akin are quite superfluous. I have therefore discarded such as *Netta* and *Fuligula*, bringing them into *Nyroca*, whilst *Histrionicus* and *Harelda* seem naturally to come within the scope of *Clangula*.

Most of the young of Diving Ducks are born between the 28th of June and the 8th of July, so that I have merely suggested July 1st as the birth date of all species. This will give the reader examining the plates a definite basis on which to reckon the ages of the Ducks, whilst at the same time he must not imagine that I assert it as the exact date of birth of each individual bird.

¹ With this I quite agree.—J. G. M.

GENUS : *Nyroca*

Many authorities assign the Red-crested Pochard to the genus *Netta*, considering that with such distinctions as the tapering bill and short *lamellæ* it is entitled to generic rank. These features, however, do not seem to me to be sufficient, and I have in consequence included it in the genus *Nyroca* which also includes *Fuligula*.¹

In the matter of uniting *Fuligula* and *Nyroca* I follow Blanford, for the distinctions of the two genera as pointed out by Salvadori and others, such as the parallel sides of the bill in *Nyroca* and the wide bases of the bill in *Fuligula*, are very slight. Even these differences, Mr. Stuart Baker points out (*Indian Ducks*, p. 233), are only a matter of degree, which he proves in the measurements of the bills of *N. baeri* and *N. Africana*.

The genus *Nyroca* is a cosmopolitan one and contains seven species which are resident or migratory to Great Britain and Ireland, two of these being of such rarity or doubtful authenticity as to be hardly reckoned as British birds.

RED-CRESTED POCHARD

Nyroca rufina (Pallas)

Anas fistularis cristata, Briss. Orn., i. p. 398 (1760).

Anas rufina, Pall. It., ii. App., p. 713, No. 28 (1773).

Branta rufina, Boie, Isis, 1822, p. 564.

Fuligula rufina, Steph. Shaw's Gen. Zool., xii. p. 188 (1824). Dresser, Naumann, and others.

Netta rufina, Kaup, Nat. Syst., p. 102 (1829).

Callichen ruficeps, C. L. Brehm, Hundb. Vög. Deutschl., p. 922 (1831).

Platypus rufinus, C. L. Brehm, tom. cit., p. 922 (1831).

Callichen micropus, C. L. Brehm, tom. cit., p. 925 (1831).

Callichen subrufinus, C. L. Brehm, tom. cit., p. 924 (1831).

Callichen rufinus, C. L. Brehm, tom. cit., p. 924 (1831).

Mergoides rufina, Eyt. Rar. Brit. B., p. 57 (1836).

Aythya rufina, Macgill, Man. Brit. Birds, p. 191 (1846).

Callichen rufescens, C. L. Brehm, Vogelfung, p. 379 (1855).

LOCAL NAMES.—Crested Pochard, Red-crested Pochard, Orange Duck, Red-crested Whistling Duck, Indian Pochard (*English*); Canard Siffleur huppé, Jaffre roux, Jaffre à bec rouge, Rougeon, Canard Mû, Boni d'Espagne (*French*); Kolbenente, König's ente (King's duck) (*German*);² Gogolji (*Bosnian*); Alma bas (*Bulgarian*); Crvena patka (*Croatian*); Kachna zrrohlava (*Czechish*); Gogolj (*Dalmatian*); Rödhovedet (*Danish*); Fistione turco, Anitra turco, Germano turco, and many others (*see* Naumann) (*Italian*); Kaezka helmiasta (*Polish*); Nyrok Krasnonosyi, Chochlatyi Nyrok (*Russian*); Rödhnfvade dykand (*Swedish*); Sivert, Anade sibaldor cristato, Anache gabais, Anate silbon, Pato, Bech vermell (*Spanish*); Tollagos (*Hungarian*).

¹ The latest classification of British birds is that found in the *Hand-list of British Birds*, by Messrs. E. Hartert, F. C. Jourdain, N. F. Ticehurst, and H. F. Witherby. This has appeared after the present work had gone to press. Mr. Hartert agrees with me that there are too many genera amongst the Ducks, but I completely fail to understand the arrangements by which the authors of the foregoing work include the Golden-Eye, Buffel-headed Duck, and Long-tailed Duck in *Nyroca*, and the Harlequin in *Histrionicus*. Steller's Eider, too, called an *Eider*, is also given a separate genera.

² Various other local German names are (translated): Club-headed diving duck, Crest-headed, hooded, red-head, hooded-whistling, yellow tufted, great lake, fire, carmine, solitary, Turkish and Bismaten Duck (Naumann).

Egg.—When fresh, the eggs are a clear green stone-colour with a gloss, but lose their bright tints and gloss after being blown, then becoming a dull greyish olive or greenish grey. The texture is smooth, fine, and clear, but somewhat fragile for a duck's egg. In form they are a broad oval with both ends the same size.

Eggs are decidedly lighter and more thin-shelled than those of the Common Pochard. Average size of 74 eggs 58.1×41.8 mm., max. 61×42 and 56.5×43.5 , min. 53.5×39.6 (or in inches, 2.28×1.64) (F. C. R. J.).

Usual number of eggs 7 to 10, but 14 and, in one case, 17 eggs have been found in a nest (W. Eagle Clark).

Young in Down.—Upper parts, dull olive-grey; under parts, buff or yellowish-grey; a buff spot on either shoulder; a yellowish-grey stripe passes over each eye, and in front of and behind the eye runs a dark stripe which divides behind the eye; irides, dark brown; bill, reddish-brown with the nail white; feet, ash-grey with a green tinge; webs and toes narrowly edged with yellowish white.

Young Male.—Somewhat similar to the female, only darker and with an indication of a crest. The centre of the feathers of the under parts are brown instead of grey, and the back and front of the breast is a much darker brown. The young male and female are easily recognised by the usual immature feathers on the lower breast, vent, and tail-coverts, and frayed tail. The principal moult commences in November with a few black feathers on the lower parts and scapulars, and proceeds rapidly in February and March.

By April the young male has gained the whole of the adult plumage, although it is not nearly so rich or bright as that of a two-year-old male. By the beginning of May the only sign of immaturity is a dark brown line as broad as a pencil on the upper surface of the bill, but this mark disappears as soon as the young male moults into full eclipse dress at the end of May, when the bird may be said to be adult at ten months. Young males bred by Mr. St. Quintin in June 1910 were just losing the last sign of immaturity on 1st May 1911, when I visited Scampston. The irides are brown or reddish brown, becoming red in March; the feet and legs, at first olivaceous orange, also become orange red in spring.

Adult Male.—Head, red-brown on throat and cheeks; forehead to end of crest, reddish-buff, having a glossy golden tint in spring; neck, blackish-brown; upper back and mantle, brown, paling towards the shoulders; the base of feathers of mantle next to the scapulars, white; rump and upper tail coverts, black, slightly glossed with green; tail, grey-brown; breast, blackish-brown, paler towards abdomen which is brown; flank, axillaries, and under wing-coverts, white; flank feathers covering wings, reddish brown; wing-coverts, greyish-brown; secondaries, white or cream; inner secondaries, grey-brown; outer primary, brown; inner primaries with much white. Bill, vermilion-red; nail, whitish or tinged yellow; legs and feet, orange with darker webs; irides, deep or light red, becoming brilliant red in spring. Length, 20 to 22 inches; wing, 10 to 10.75 inches; tarsus, 1.5 to 1.7 inch; bill, 2.3 to 2.4 inches. Weight 1 lb. 12 oz. to 2 lb. 14 oz.

If we do not accept the summer plumage of the Long-tailed Duck as an eclipse dress for reasons to be explained later, the Red-crested Pochard and the Gadwall are the earliest species to change from spring into the eclipse dress. A male in my possession began to dress the first brownish-grey feathers on the flank as early as 10th May, and

another in the Scampston collection was in full moult on 20th May. The eclipse dress of the male is very like the plumage of the female, but they may be at once distinguished by the wings, and the brighter colour of the eye, eyelids, bill, and feet, and by the darker colour of the underparts. The crest also is much longer and more pronounced.

The windpipe of the male is very much like that of *Mergus merganser*. There are two extensions, and at the top of the lower part of the throat there is an angular instead of the usual round drum of bone. Towards the left side it is oblique, and consists of rounded swellings of bone with apertures in the skin.

Adult Female.—Crown, dark grey-brown; cheeks and sides of neck, grey; scapulars, grey-brown; wings similar to male, but paler, and marked in the centre of the secondaries with dark brown; underparts, greyish white; brownish grey on the flanks; wing-coverts grey-brown, with dark brown centres to the feathers; round vent and under tail-coverts, grey-brown. Bill, dusky black; becoming paler towards the nail, which is yellowish or reddish-orange. Irides, brown or reddish-brown; legs and feet, dull yellow, with darker webs.

Length, 20.1 to 22 inches; wing, 9 to 10.25 inches; tarsus, 1.5 to 1.75 inch; weight, 1 lb. 10 oz. to 2 lb. 6 oz. (Hume).

The young female is smaller and paler than the adult, but attains its complete plumage and colouring by the end of March.

BREEDING RANGE.—The general distribution of this beautiful duck extends from the Mediterranean region eastward to Central Asia, whilst it occasionally breeds in Central Europe (Germany and S. Hungary).

S. France.—W. E. Clark (*Ibis*, 1895, p. 202) states that it breeds in the Carmagne; Collingwood Ingram (*Field*, Sept. 5 and 19, 1908) also gives interesting notes of its nesting in the south of France.

Balearic Isles.—Nests in Majorca (Von Homeyer, *J. F. Orn.*, 1862, p. 434).

Spain.—Breeds in Valencia (Saunders, Lilford, Irby, &c.). It has recently been recorded as breeding in numbers in the Lagunas de Daimiel, La Mancha, Central Spain, by A. Chapman (*Unexplored Spain*, pp. 190 and 410).

Sardinia.—Salvadori states that some breed (see Brooke, *Ibis*, 1873, p. 344). This is confirmed by Bononi (Giglioli, *Avifaune locali*, p. 624).

Sicily.—Breeds in Catania and Lentini (Giglioli, *Avifaune locali*, p. 568; *Ootheca wolleyana*, ii. p. 583); Catania, Terranova (Doderlein). Howard Saunders records it as one of the commonest breeding ducks.

Italy.—Not rare in the marshes of North Italy, and probably breeds (Carrigoni).

Germany.—Bred for at least four years near Mansfelder See (Baldamus, *J. F. Orn.*, 1870, p. 278; see also Naumann), also in Krakoner See in Mecklenburg (see Rey, *Eier d. v. Mitt. Europ.*, p. 650; and Fritsch, *J. F. Orn.*, 1872, p. 370).

S. Hungary.—See *Neuer Naumann*, vol. x. p. 198. Hocke also mentions eggs from Banat.

Roumania.—Dr. Cullen stated to Elwes and Buckley that it bred in the Dobrudscha; one killed by Sintenis Bros. on May 15, 1873, possibly breeding. Dombrowski states that it breeds in small numbers. There is an egg from the Danube in the British Museum (ex-Seeböhm Coll.), and Jourdain met with several breeding pairs there in 1911.



Printed by Albert Frisch-Berlin

RED-CRESTED POCHARD
adult male and female

Galicia.—I have seen this duck in the marshes near Lemberg in September, and saw specimens that were killed in summer near Niedworna, where it probably breeds. Saunders (*Manual*, p. 442) mentions it as frequently breeding in the valley of the Danube. This, I think, refers to the lower part near the mouth.

Russia.—Breeds in the governments of Kherson, Ekaterinoslav, Taurida, the Lower Don, Caucasus and Transcaucasia, the Volga N. to $53\frac{1}{2}^{\circ}$ and east to the Ufa government, and the Kirghis steppes (Buturlin).

Africa: Algeria.—Resident, and breeding (H. B. Tristram, *Ibis*, 1860, p. 164). There are eggs in the British Museum (see Catalogue II., p. 179; and O. Salvin, *Ibis*, 1859, pp. 358 and 363). I saw several of these ducks in the salt lagoons to the east of Oran in April 1899, and was told by natives that they bred there. I noted other specimens in the market of Algiers about the same date. Rare, and possibly breeding in Egypt.

Asia.—According to Rey (p. 650) it breeds in the Aral Sea, Transcaucasia, Turkestan, and Siberia; Caucasus (see Radde, *Ornis Caucasica*, p. 463). H. Schalow (*J. F. Orn.*, 1908, p. 83) says it breeds in East Turkestan and the whole of the Tian Shan district of Siberia, and Johansen says it breeds commonly in the S.W. Tomsk government. It is also a common breeder in Yarkand (*II. Yark Mission, aves*, R. B. Sharpe, p. 129; *Stray Feathers*, iv. p. 201). Saunders (*Manual*, p. 442) states that it breeds in "N. Persia, Turkestan East to Lob-Nor, but not in Siberia." Stuart Baker (*Indian Ducks*, p. 214) states that it breeds in Persia as far south as Shiraz (see also *Zool. of Eastern Persia*, O. St. John, p. 302). It arrives late in the season in India, but does not breed there.

WINTER RANGE.—The general winter range of this species is Southern Europe, notably the countries bordering the Mediterranean, North Africa, the Black and Caspian Seas, North and Central India, and occasionally China.

It is abundant in Sardinia in the winter and spring, also in Mesopotamia (A. G. Tomlinson) in winter. Very common in N.W. Africa, such as Tunisia and Algeria, but scarce in Morocco (see Whitaker, *Birds of Tunisia*, ii. p. 213; and Irby, *Orn. Str. Gibr.*, 2nd. ed., p. 226); rare in Lower Egypt (Von Heuglin (*Ornith. N.O. Afrikas*, p. 68); common on the S. Caspian, Talysch lowlands and Bokhara, &c. (Loudon, *J. F. Orn.*, 1910, p. 73). A few winter in Montenegro and probably in Southern Hungary. A very complete account of the winter distribution of this species in India is given by Stuart Baker in *Indian Ducks and their Allies*, p. 210. He states that it is common throughout the whole of Northern and Central India in winter. In Assam it is less common, but becomes rare in Southern India and in the extreme West. The same author thinks it is found at times throughout the whole of the Indian Peninsula, and gives abundant details of its local distribution. In the Shan States it is scarce (*Ibis*, 1901, p. 561), but it is nevertheless a regular winter visitor to Burmah (Harrington, *Birds of Burma*, 1909). A few visit Ceylon (*P. Z. S.*, 1873, p. 208), and it is common in Afghanistan in March (*Ibis*, 1882, p. 125) and occasionally shot on the Kashmir lakes. To Middle Europe the species is only of casual occurrence. References of its appearance in the Baltic provinces, Voronezh, Charkoff, Podolia, and Orel, are given (in *J. F. Orn.*, 1909, p. 581); Belgium (three recorded); N. France (rare); fairly common in Moravia, Silesia, and Hungary in autumn and spring, where I have seen them; Greece, Denmark, Servia, and Holland, occasional; in Normandy only once; in North America a single specimen was found in the New York market, February 1872

(*A. O. U.* check list). Its supposed occurrence in Iceland is stated by Hantzsch (p. 182) to be erroneous.

As a visitor to Great Britain, Mr. Dresser (p. 560) regards it as "extremely rare." This, I should say, is somewhat overstating the case, for whilst its appearance is only casual or irregular, scarcely a winter now passes without specimens being noted or killed within our islands. This may be due principally to the fact that the number of competent observers is greatly increased since Mr. Dresser wrote his *Birds of Europe*, and also may in some part be due to the fact that aviculturists have bred the species in confinement and have allowed the young to wander away. It is scarcely within the limits of these volumes to record every instance of the capture of ducks of only comparative rarity, so I must ask my readers who wish for details of the capture of the first sixteen examples (between the years 1818 and 1869) to turn to Mr. Harting's *Handbook of British Birds*, where they will find details. Nearly all of these birds were taken in Norfolk, with the exception of one from Cornwall and one from E. Devon. Mr. Saunders in his *Manual* states (p. 441) that "others have been taken along the east coast between Berwick-on-Tweed and the mouth of the Thames," but does not give details. I have at various times inspected nearly every public and private collection of British birds, and have seldom failed to notice specimens of this duck, generally killed locally. So that we must presume that it is not such a rarity as some naturalists would suggest, though the majority of these have not been recorded. I possess a fine adult male killed near Cambridge in the winter of 1882 (figured by Mr. Thorburn), and saw others in the hands of Mr. Dogget (Cambridge) which had been killed at Ely at the same date. The Red-crested Pochard has occurred twice in Yorkshire (*British Birds*, vol. ii. p. 416), whilst Mr. H. W. Ford-Lindsay records in the same periodical (vol. iv. p. 316) a flock of sixteen at Borehambridge, Sussex, at the end of January 1911, from which two drakes and a duck were killed. There are also records from Suffolk, Essex, Herts, Hants, Dorset, Pembroke, and Westmoreland.

The only example obtained in Ireland is one now in the collection of Sir Ralph Payne-Gallwey. It was shot by Mr. Victor M'Cowen near Tralee on January 18, 1881, and was exhibited by A. G. More before the Zoological Society on March 15, 1881 (*P. Z. S.*, 1881, p. 409).

In Scotland the species is also very rare. One was obtained in Argyllshire in January 1862 (*P. Z. S.*, 1862, p. 163). Two young males were shot near Oban in the winter of 1898, as I am informed by Mr. Bishop, the Oban taxidermist, who mounted them. These have not previously been recorded.

HABITS.—Essentially a southern species, the Red-crested Pochard comes north to Germany or to England in October and November before the frost and snow, and leaves for the south on the first signs of Arctic conditions, whilst a few come north in March and April and wander about in small parties before seeking their breeding-places in May. In Europe they do not appear to be very gregarious, as they are in India, where they arrive in flocks of thousands in late October and November. Hume mentions finding them in "flocks of many thousands and acres of water paved with them," whilst Reid says: "One morning in December I came across countless numbers in a jheel in the Fyzabad district, closely packed and covering the whole surface of the water, with their red heads moving independently, while the breeze kept their crests in motion;



Courtship attitudes of the Red-crested and Common Pochard.

a distant spectator might have mistaken them for a vast expanse of beautiful aquatic flowers."

Mr. Stuart Baker considers that the Red-crested Pochard likes to congregate into very large flocks, and "it is only when the country is not very well suited to their wants that they split up into small parties, and under these circumstances very small flocks and even pairs and single birds may be sometimes seen" (p. 211). In Southern Europe, probably owing to the species being comparatively speaking scarce, it is rare to find large flocks of these birds together. Even where they are fairly common they are usually noted in small parties.

The Red-crested Pochard is essentially a duck of the fresh water, and is never found upon the open sea. The ponds and lakes they like to frequent are reedy, sedge-lined sheets of water with a considerable area of deep water in the centre. Naumann thus correctly describes their haunts (trans.):—

"Pieces of stagnant water of large circumference, whether the water be salt or fresh, with a great deal of sedge or reeds on the banks, green islands, and also large open expanses of water they seem to like best, and from them they visit the smaller ponds close to the swamps and marshes, especially if at a suitable depth of water a great many plants grow on the bottom. Sometimes on their wanderings they fall in love with smaller ponds, as has been proved to us in this district by a beautiful female which was killed on a small mill-pond full of sedge and surrounded by plantations of trees and orchards; but for a more continuous stay they require, on account of their great timidity, larger expanses of water. They only visit large and swiftly-flowing rivers as occasional places of refuge; for a longer stay they keep to the quiet corners of such streams. They have much in common with the *F. ferina*, both as regards the colouring of their feathers and their places of sojourn, and this seems to point to their being nearly akin.

"They do not avoid trees and shrubs, as has been already remarked, and they have been found on pieces of water both in open and wooded districts, and even upon lakes and large ponds quite surrounded by woods; they always keep to the middle of these, or far removed from the bank and generally on open water, seldom come up to the bank, and with the exception of the breeding time hide themselves still less often in sedge and other plant-growths. They like best pools on the bottom of which grow a great many submerged water-plants; on those which have a clean bottom they do not stay for long, or if there are spots which have submerged plant-growths they generally keep entirely to these and always come back to them after they have been disturbed, and in the autumn they not infrequently remain for weeks on pools which suit them."

The foregoing exactly describes the nature of the habitat of this duck, and in such places I have seen them in Hungary, Silesia, and Moravia, but the usual habitat of the species in North Africa is somewhat different. Here they live in the centre of great shallow lagoons of brackish water, whose sides are often quite bare of vegetation and are encrusted with saline deposits. These great bitter lakes east of Oran, in Algeria, are bald and shelterless, but there must be food there, as the Red-crested Pochards may be seen diving in the centre with assiduity. Doubtless they spend much of their time in resting in these lakes, and work out at night the smaller pools whose approach by day would be dangerous, for behind rocks there hides the ubiquitous Arab and his gun. At a great distance on the water it is possible to mistake this species for the common Pochard, but at a closer range it is very easy to recognise. In flight both male and female show much white in the wing; the black under parts of the male and whitish throat of the female are also characteristic.

The Red-crested Pochard frequently comes ashore on lakes where they are seldom disturbed, but if much harassed they keep to the deep water the whole day. On land they stand and walk in a manner quite different from other diving ducks, and seem to be able to walk and run with less roll and greater ease than other species. At such times the neck is very much drawn up, with the bill depressed, and when moving fast it takes the form of the letter S, whilst the body is held more or less horizontal. If they approach anything suspicious or are suddenly frightened, the body is suddenly held up. They seldom leave the banks of a lake except during the nesting season. In swimming, or when about to dive for food, the body is held low in the water, the tail trailing on the surface, the neck is stiff and almost upright, and the bill held depressed. The bird at such times has an air of intent alertness, as if minutely searching the depths below. Although skilful divers, they do not stay below the surface as long as other species, thirty seconds being a long dive. Unlike other diving ducks they show a distinct preference for shallows at certain seasons, and especially in places where they are undisturbed. Here they may be seen paddling for hours round the edge of a lake, frequently tipping up the hinder parts after the fashion of Mallard or Pintail, and reaching for delicacies with their long necks. Their flight is similar to other diving species, and it is accompanied by a faint whistling sound, and is strong and well sustained. They have some difficulty in rising if there is no wind.

Legge affirms that this duck regularly feeds in the shallows as described above, and that it does not dive for its food, which is scarcely correct, for the bird employs both methods; and Hume, commenting on this, remarks: "I should like to know where he obtained his valuable information. The fact is, that though you may at times see it dibbling about in the water like Teal and Shovellers, or again feeding as he describes, its normal habit and practice *is* to dive, and I have watched flocks of them, scores of times, diving for an hour at a time with pertinacity and energy unsurpassed by any other wild fowl. Examine closely their favourite haunts, and you will find these to be almost invariably just those waters in which they *must* dive for their food: deep broads, where the feathery water-weed beds do not reach within several feet of the surface, not the comparatively shallow ones, where the same weeds lie in thick masses coiled along the surface."

Doubtless Mr. Hume is right in the main, but in Sardinia and other places this duck frequents in Europe many of the lagoons are very shallow, and the birds obtain much of their food by tipping up and reaching for it. Moreover, although the circumstance does not bear any solid comparison to their habits in a wild state, it is worth noticing that in confinement, even on large sheets of water, the Red-crested Pochard spends as much time searching for food round the sides as it does by diving in the middle of the lake.

Those that I have kept and others I have watched in the enclosures of Mr. St. Quintin and Mr. Dennis followed this practice. We must also take into account that the birds observed by Hume and Stuart Baker, who confirms Hume's views, were subject to frequent molestation, and that they were in *very large flocks*, which as individuals would be always shy of approaching shallows and more suspicious. Naumann thus treats of their cautious nature:—

Red-crested Pochard

II

"They are very suspicious and timid, and on large waters keep away from human beings as much as possible, first by swimming, then by flying, but like soon to come back to the first place. On small pieces of water and when driven up to unusual places, on the other hand, they are not at all timid, probably out of nervousness. They at the same time like to keep together, and are all the more timid the more there are together; it is only solitary birds which are less wild. But their gregariousness is seldom extended to other species, and even if they mingle with others whilst they are busied in swimming, it is noticed when they fly away that they like to part company with the strangers, and so solitary specimens are much oftener met with quite alone than amongst other duck. Large flocks of these duck always keep together, and if they are forcibly divided they fly restlessly about until they have joined the flock again. On a large expanse of water this happens, as a rule, at the same place at which they were first seen."

Their food consists chiefly of vegetable matter, but they also eat quantities of insects, shellfish, fish, frogs, and spawn. Stuart Baker says that in the Sunderbunds they feed on the tiny red crabs that swarm in the rivers and swamps, and that although nearly purely aquatic in their feeding, they have been known to feed on "young crops on dry land."

They feed both by day and night, but generally in the early morning and at sunset, resting and preening during the warm hours of the day.

Naumann says:—

"These duck like to feed on tender roots, buds, shoots, the tips of leaves, flowers and seeds of various kinds of plants growing rampant at the bottom of the water—thus on any kinds of *Potamogeton*, of *Myriophyllum* and *Ceratophyllum*. As the last-named grow in a considerable depth of water, shooting up high towards the surface, and often form thick green plantations under the water, such places in the pool are the favourite haunt of these duck. They are continually diving down in search of such undergrowth, and occasionally, in addition to the vegetable food, they catch the living creatures to be found on them. In places where this undergrowth approaches nearer to the surface, they attempt to get at it by merely tipping up the hinder part of the body and reaching for it by stretching the neck down vertically. They also fish for much which they enjoy when merely swimming on the surface, but they employ the last two methods less often than that of diving under completely for their food. For this reason they like deep water, and come extremely seldom to the bank for the sake of getting food.

"Along with the above-mentioned substances their stomachs always contain a quantity of sand and small pebbles the size of peas."

The usual call generally uttered by the female is a harsh "kurr," and is not often emitted except in moments of excitement. Hume says the male utters a "sharp sibilant note—a sort of whistle," but does not state at what season he has heard it. This note is commonly uttered by the male in courtship, but I have never heard it at other times.

The Red-crested Pochards arrive at their breeding-places at the end of March or early in April, but the females do not begin making their nests till the end of the latter month. The courtship of the male is somewhat showy but not very varied. It throws up the body from the water, depressing the bill to the fore part of the neck, and at the same time displaying, *i.e.* erecting and spreading the whole of the beautiful feathers of the crest, the body raised to about an angle of 75°. During this sudden act of show the bird utters a low squeaking whistle, and as the body falls to the water again the crest resumes its normal position, and, releasing the air in the chest, it utters a low grunt or groan. Sometimes when in full show the male will frequently swim round the female with depressed bill and expanded crest, but beyond this I have seen no other efforts at display. The female resorts to attitudes similar to the other diving species, such as swimming round the male with lowered body and extended head and neck held out along the water. She also frequently utters her harsh guttural cry at this season.

Writing of the breeding of this species in Algeria, Canon Tristram says (*Ibis*, 1860, p. 164):—

"I obtained a single egg of the Red-crested Whistling Duck in the open swamps. . . . *Fuligula rufina* breeds sparingly at the lake, but remains there throughout the winter. The males appear to desert the locality as soon as the females sit, and are never seen again until the end of the autumn. I have observed that the female erects her scanty crest in imitation of her mate, and proudly throws back her head, walking with a stately gait. The nest is like that of the Coot, but not so large and better concealed, and without the gangway of rushes built by the other."

Dr. Baldamus, who took ten nests in 1866–70 in Central Germany, states that:—

"The nest is always placed in the rushes or flags, usually on a small island in the pond or on the flags; and, like all ducks' nests, it has a foundation of rotten stems of rushes and dead leaves, on which a warm bed of down is placed, this down being plucked from the breast of the female. When the female leaves the nest quietly, she covers her eggs, as do all the ducks, even our common tame species. . . . During the time the female is sitting the males are to be seen on the water with those of *ferina*, *leucoptalmus*, and *clypeata*, but generally somewhat apart from them."

Dr. Baldamus (*Jour. F. O.*, 1870, p. 278) gives a list of a number of clutches of eggs in his possession, and proves that this duck usually lays from 6 to 9 eggs, and occasionally 10. Fresh eggs were found from May 13th to June 17th.

With regard to their habits in the nesting season Naumann says:—

"At the beginning of the nesting time the pair keep very close together and always near the nest; later on, when the female is sitting, the male bird goes away more, and often looks on at disturbances which befall the nest only from a distance, whilst the female appears to be much tamer and is easily sacrificed for her brood. Towards the end of July the young are, as a rule, able to fly. This is all which has hitherto come within our own experience about the breeding of this beautiful duck."

Those who have had experience in studying these ducks are of opinion that they are shy and difficult to approach when in large flocks, but as easily killed as other Diving Ducks when found on small pieces of water. Mr. Stuart Baker, who has had many opportunities of studying the species, says (p. 213):—

"From a sporting point of view, the Red-crested Pochard is all that can be desired. About as smart as they make them, he seems to have special aptitude for judging the length of range of different guns; and a flock may be caught once but seldom twice, whatever the distance the gun may reach. They swim so fast that they can by this means generally escape, and they are often very loath to rise when they can thus get out of shot."

As a table bird the Red-crested Pochard resembles the Common Pochard and the Wigeon in its flesh. That is to say, when it feeds on fish and shell-fish it is rank and uneatable, and when it eats vegetable matter it is excellent.

"On account of their great timidity," says Naumann, "you can only creep up to them to shoot them unseen and against the wind, if they are swimming near enough to the bank; but as they almost always choose the open centre of larger pieces of water as their places of sojourn, there is in this case no other method than to approach them openly in a boat, which can certainly only succeed with solitary specimens if they have not yet suffered any pursuit at that place, and then not always, whilst larger flocks generally take to flight when within a hundred paces of you. Occasionally when flying round afterwards they get near enough to the boat for a lucky shot. In the morning and evening twilight they are sometimes by chance brought down when flying over. It is easy to creep up to solitary specimens which have wandered off to a small pond if some care is exercised, but they can seldom endure to be shot at by a gun approaching them openly. Birds which have been lamed by a shot are generally lost to the pursuer on larger pieces of water, even with the help of a good water-dog, as they do not easily tire of diving



RED-CRESTED POCHARD
Adult male in eclipse.

COMMON POCHARD
Adult male in eclipse.



FERRUGINOUS DUCK
Adult male in eclipse.

TUFTED DUCK
Adult male in eclipse.

under, and, if they can reach some sedge, are very clever at hiding themselves in it, and in so doing only keep the head as far as the eye above the surface of the water.

"They can easily be caught in large decoy nets placed at their favourite places in the water."

In the intestines of these ducks are generally found certain worms such as *Echinorhynchus filicollis*, *Tænia lævis*; and in the feathers certain insects, *Docophorus icterodes*, *Norinus stenopygus*, *Torinstum luridum*.

In confinement I have found this species rather troublesome owing to its greediness. They soon become very tame, and will devour food in such quantity and at such a rate that the shyer divers such as Golden-Eye, Scaup, &c. have little chance of obtaining a fair share. In consequence it is best to keep the species in a separate enclosure or in company with other birds whose feeding habits are different. I do not think that any of our aviculturists have been more successful in breeding this fine species than Mr. W. H. St. Quintin at Scampston Hall, Yorkshire, and I am indebted to Mr. A. F. Moody, who takes care of his birds, for the following interesting notes:—

"Red-crested Pochards have been kept here for many years. They are good doers and breed freely in confinement. The males, when in colour, are also handsome birds, and we find one drawback to this species, in a mixed collection like ours, is that they are greedy feeders, and, being naturally tame, it is difficult to prevent them partaking too freely of the sea ducks' food, or rather the prepared barley meal which, in their case, combined with the bird's rather sluggish habits, proves too stimulating and conducive to an excessive and occasionally fatal accumulation of internal fat. This, I find, is best guarded against by periodically (about twice per year) enticing them into a smaller enclosure and for a few weeks limiting them to a sparing grain diet. As regards breeding, the Red-crest is an early layer (April), and usually produces clutches of from 7 to 9 rather round and Mallard-like eggs; these are deposited in a bulky nest which, as incubation commences, is abundantly lined with large greyish down. The bird is a close sitter, and the site chosen for the nest is usually beneath some thick bush or amidst dense undergrowth. Incubation, in the only instance I have timed, lasted twenty-seven days. The young are not more difficult to rear than many of the commoner species, and concerning the age at which they mature, when the sexes can be distinguished, &c., I have notes to the effect that the only male of a brood of five young Red-crests, hatched May 26, 1910, first began to differ from the females when a little under seven weeks old (July 12) by some slight indications of pink appearing about the sides of the bill nearest the base, and by the feathers of the crown becoming slightly darker and more erect; also I have further notes stating that by August 22 the bill had gained much colour, and the first indications of a change of plumage had commenced by a few black specks appearing on the breast, also that on April 26 of the following year the same bird, except that it retained an irregular band or streak of brown down the centre of the still rather imperfectly coloured bill, and had the general plumage less intense or glossy (this deficiency does not apply to the crest), appeared adult. In confinement I find this Pochard evinces a tendency to hybridise, and one male cared little for a certain female which for years mated and produced unfertile eggs to an old Brazilian Teal Drake. Hybrids have been reared here on two occasions, the first instance being rather a handsome male, the result of a cross between a male Common Pochard and a female Red-crest, the second the offspring of a union between a male Wigeon and female Red-crest. This latter hybrid (a female) was rather a curious bird, partaking in general appearance after the female parent, but, with the Wigeon, small feet and lack of diving power. Both these hybrids (the male, being unpinioned, enjoyed full liberty) thrived here for some years, and were eventually killed and forwarded for preservation to the National Collection."

When first introduced to this country (1874), when specimens were presented to the Zoological Society by Sir Edward Buck, dealers asked as much as £30 a pair; now the price of a pair is, amongst the Holland dealers, from £3 to £4. M. Achille Roffay, of Angers, as well as Mr. Blaauw and Continental dealers, have bred many of these ducks, whilst in England they have nested at Woburn and with the Hon. Rose Hubbard.

COMMON POCHARD

Nyroca ferina (Linnæus)

- Anas ferina*, Linn. Syst. Nat., x. Ed., i. p. 126 (1758).
Anas penelope, Briss. Orn. vi., p. 384, pl. xxxv., fig. 1 (1760).
Anas ferina, Linn. Syst. Nat., xii. Ed., i. p. 203 (1766).
Anas rufficollis, Scop. Ann. i. Hist. Nat., p. 66 (1769, *nec* Pall.).
Anas lurida, S. G. Gmel., Reise dwich Russl., i. p. 70 (1770).
Anas erythrocephala, S. G. Gmel., tom. cit., p. 71 (1770).
Le millouin, Buff. Hist. Nat. Ois., ix. p. 216 (1783).
Anas rufa, Gmel., Syst. Nat., i. p. 515 (1788).
Nyroca ferina (L.), Fleming, Phil. of Zool., ii. p. 260 (1822); Salvadori, Blanford, Stuart-Baker, Cat-birds, Brit. Mus., &c.
Athya ferina (L.), Boie, *Ibis*, 1822, p. 564; Jerdon, Hume, Adams, Butler, &c.
Fuligula ferina (L.), Steph. in Shaw's Gen. Zool., xii., pt. ii. 193 (1824); Davids and Hend., Hume, Hume and Marshall, Legge, Butler, Reid, Taylor, Dresser, Naumann, Nilsson, &c.
Platypus ferinus (L.), C. L. Brehm, Lehrb. Naturg. Ewi. Vög., ii. p. 828 (1824).
Athya erythrocephala (Gmel.), C. L. Brehm, Vög. Deutschl., p. 919 (1831).
Anas marila, Malh. Faun. Orn. Sicil., p. 221 (1843, *nec* Linn.).
Fulix ferina (L.), Salvadori, Fauna d'Italia, Uccelli, p. 265 (1872). (L.)

LOCAL NAMES.—Pochard, Poker, Red-head, Red-headed Poker, Red-eyed Poker, Dun-bird (generally, but not exclusively, applied to females and young), Red-headed Wigeon, Snuffle-headed Wigeon, Red-headed Curre, Dun Curre (*English*); Lacha-mhasach (*Gaelic*); Hwyardan Bengoch (*Welsh*); Homari (*Arabic*); Ridwak (*Bosnian*); Patka Kaljuza, Patka glavata (*Croatian*); Polak velky (*Czechisch*); Golesbak (*Dalmatian*); Taffeland, Brunakke, Rodnakke (*Danish*); Punasotka, Punatelka (*Finnish*); Milouin, Rouget, Tétard à tête rouge (*French*); Road-hoaded, Slabb-Enn (*Heligoland*); Tafeleend, Roodkop, Valinger (*Dutch*); Moriglione, Collorosso, Mouretton, Magasson (female), Fischone (*Italian*); Braimla hanvra (*Maltese*); Taffeland (*Norwegian*); Kaczka ponur (*Polish*); Tarrantana, Catullo (*Portuguese*); Rijegolowka, Tebernedj, Krasnogolowaja, Krasnogolowyi myrok (*Russian*); Rodhalsad Dykland, Brunand, Brunta (*Swedish*); Busciu, Caburossu (*Sardinian*); Caberson, Anach gavaita, Capiroto, Buixot, Sivert, Cenizo, Boix, Moixo, Tarrantana (*Spanish*); Kermesibrasch-giri (*Tartar*); Hamvas, Barat recze (*Hungarian*); Tafelente, Tafelmoorente (*German*).

There are two distinct forms of this Duck—*N. ferina ferina* (L.), which inhabits the Palæarctic regions, and *N. ferina americana* (Gmel.), which is only sub-specifically different, and inhabits the Neartic regions. The latter may be recognised by its larger size and more intense colouring and the black edges to the wing-coverts and no black at the base of the bill. So far the American race has not occurred in Europe. Gmelin, Wilson, Bonaparte, Audubon, Schlegel, and others regard this American Pochard as identical with the European species, but Sclater, Gray, Newton, Baird, &c., look upon it as a distinct species (*Fulig. americana*). Allen, Coues, and others, I think correctly, look upon it only as a good sub-species (*F. ferina americana*).

Egg.—The eggs are a somewhat broad oval with the shell waxy and smooth but not glossy. In colour a pale greenish grey, generally tinged with yellow. After being blown they often assume a dull brownish drab colour. Average size of 100 eggs, 61.4×43.6 mm. Max., 68×45.5 and 64×46.5 ; min., 57.2×43 and 61×39.2 (or in inches, 2.42×1.72) (F. C. R. J.).



Printed by Albert Frisch-Berlin

COMMON POCHARD
adult male and female

No. of eggs 6 or 7 to 11 as a rule, exceptionally 13 and 14. Mr. Jourdain has seen clutches of 11 eggs more than once.

Incubation 24 days (Hon. Gerald Legge), 23 days (Naumann).

Young in Down.—Rusty brown on crown and back of neck; upper parts brown, inclined to be rusty near the neck and on the wings and thighs. A pale brownish yellow on the side of the back; under parts yellowish white; cheeks and stripe above the eye yellowish white with a slight brown tint. The irides are dark grey (Hon. Gerald Legge). Salvadori states that the legs, feet, and bill are "light bluish," but Mr. Gerald Legge, who has had good opportunities of studying the young, since he had raised two lots from the egg, sends me the following description of one that died in his possession at four days old: "Bill, lower mandible, light flesh colour. Upper mandible, dark brown, getting a little lighter towards nail. Nail, dark flesh colour. Feet and legs, black on under side of the leg, with an olive yellow stripe running down the side of each toe. An olive yellow stripe also runs down the outside and inner side of the leg."

Immature Male.—In August the forehead and crown dark brown, the rest of the head and neck fulvous brown, in some cases turning to grey on the throat and chin; chest grey brown, with a distinct russet tinge; under parts grey, with whitish ends to the feathers; back of the mantle vermiculated with light grey; rest of the mantle, scapulars, and wing coverts brown, with the scapulars edged with rusty brownish yellow; rump brownish black; wings similar to female at first, but becoming lighter in the secondaries during winter; vent and thighs grey brown; a few white-edged feathers on the under tail-coverts. The breast and head are never so light as in young females. In September the cheeks and neck, especially at the sides near the mantle, assume a much richer red brown tint. In August the irides are a dark amber colour. In November the first feathers of maturity make their appearance in the young male. Many red feathers come into the head and neck, and grey ones into the scapulars, mantle, and back. It is a curious fact that when the black feathers appear they do so from the base of the neck and extend along the sides of neck to the mantle, each feather being edged with grey brown (which wears off by the end of March). Early in January young male Pochards usually change to the adult plumage on the head, neck, and all the upper parts, and are still in immature dress on all the lower parts from chest to tail-coverts. I have killed young males on January 15, probably early-hatched birds, that were almost in complete full dress, only a few immature feathers being left on the belly, and others bearing the last traces of immaturity at the end of that month, so that we may say that the young male is adult at eight months. The whole plumage of the young male when it has assumed full dress in February is never so rich or complete as that of older birds; the back and scapulars especially are of a duller grey. Those who know the Pochard well can also notice a difference in colour between second and third year, for it is not until the third spring that the male Pochard is attired in full beauty. Nevertheless young males in full dress will pair and breed during the first spring. In July it passes into eclipse.

Adult Male.—Whole head and neck a deep rich chestnut, upper breast and hind neck, black. In winter this black breast shield is edged with grey on its lower half, but these grey edges wear off in April, and the breast is quite black until July. Rump, upper tail-coverts, and under tail-coverts, black; upper parts, clear grey, finely vermi-

culated with waving black bars; lower breast, belly, and flanks the same, becoming darker towards the vent; primaries dark grey, edged on the outside and tipped with dull black; secondaries forming a dull grey speculum, the upper feathers edged with black, but not to the same extent as the American Pochard, of which these markings are a characteristic mark of identification. Upper part of the wing, dull grey with light grey vermiculations; tail greyish brown. There is usually a pure white spot on the apex of the chin.

The older the male, the richer and cleaner are the spring markings, so that the shoulders and scapulars look almost pearl-grey in the finest specimens. Irides, reddish-yellow until March, when they become a brilliant red, the colour of Japanese lacquer. Legs and feet, bluish or slatey-grey with dull black webs. Bill, upper part bluish-black separated from the black point by lead-blue crescentic bar. The nail is very black. The crescentic bar of lighter colour varies in size in individuals. Length, 18 to 20 inches; wing, 8.5 to 9.5 inches; tarsus, 1.4 to 1.5 inches; bill, 2.15 to 2.3 inches. Weight, 1 lb. 13 oz. to 2 lb. 5 oz. (Hume).

The eclipse plumage of the male Pochard is rare and little known, and was first described by Naumann.¹

Specimens seem to have been unknown in this country until I exhibited two males, shot by myself on Loch Flemington, Nairnshire, on August 1, 1890, at the meeting of the British Ornithologists' Club on April 25, 1906. Mr. Bonhote, who has kept Pochards in confinement, stated that males he kept in confinement had never assumed an eclipse dress, whilst others that I kept only showed a few feathers of such a plumage. The fact that my birds did exhibit a tendency to change led me to presume that in a wild state they would, under natural conditions, go still further, a surmise that proved to be correct. But it was only after repeated failures that I at last found some adult males in Nairnshire at the right season and succeeded in killing two in full eclipse dress.

In July and August the adult male is very like the adult female in her breeding dress, a plumage very distinct from that worn by her in winter. But the male can always be recognised by having the under tail-coverts dull black and edged with grey, whilst the whole of the scapulars and mantle are light grey and vermiculated, the plumage being, however, much darker than that worn by the male in spring. The chest changes from black to dark grey, each feather edged with yellowish white in front, with russet at the upper mantle. The crown is dark brown, and cheeks and rest of the head and neck red brown; the white spot on the chin disappears; flanks, intermixed light grey vermiculated feathers and dark grey with sandy edges; rump, dull black. The tail, wings, and wing-coverts are not shed until the middle of August, and then renewed direct to winter plumage; the bill at this season is a dull bluish-black all over.

The moulting season of the adult male commences early in July, and by the latter half of this month the tail and wings are falling and the bird is unable to fly for a short time. The adult females moult about a fortnight or three weeks later. It is not unusual to find that adult males have cast all traces of their eclipse dress by the last week in September and are in full winter plumage.

¹ Cf. *Naturgesch. Vög. Mitteleuropas*, x., pp. 174-181; pl. xiv., fig. 2 (1901). This plumage is also mentioned by Seebohm, *Hist. Brit. Birds*, iii., p. 578 (1885).

The male has a fairly large windpipe, which is the same width throughout. At the point of division into two channels there is a drum or excrescence of bone of which the larger part on the left side is more angular than round. It has two apertures in the skin divided by a bent bone, but the smaller more round-shaped right side has only one small aperture. Weight, 2 lb. 2 oz. to 2 lb. 8 oz.

Adult Female.—Forehead and crown, dark brown, becoming fulvous brown at the back of the cheeks and hind-neck; cheeks and fore part of the neck, fulvous grey. In very old females the cheeks and neck become reddish brown and the chin yellowish white. I have killed two bearing these characters. Hind-neck and upper mantle, reddish-brown; lower mantle, scapulars, and flanks, grey vermiculated with blackish-brown; rump, brownish-black; greyish-black round the vent, becoming whitish-grey on the under tail-coverts; the breast and under parts vary a good deal in individuals, some being a greyish-white all over, others showing much dark grey on the central parts of the feathers; tail and wings are similar to the male, only duller and darker.

Irides, dull yellow, sometimes brown; bill, similar to the male but not so bright, the crescentic blue mark more restricted; legs and feet similar to male but duller.

Length, 17.25 to 18 inches; wing, 8 to 8.3 inches; tarsus, 1.4 to 1.5 inch; bill, 2 to 2.2 inches. "Weight, 1 lb. 5 oz. to 2 lb. 4 oz." (Hume).

During the nesting season and until the end of August the adult female Pochard undergoes a considerable change of plumage all over the breast and chest, which is now brown-grey with broad white edges to the feathers; the head and neck, too, become a warm reddish-brown with fine grey edges to the feathers on neck and cheek. Except for the back, scapulars, and under tail-coverts, it is not easy to distinguish the female at this season from the male in eclipse.

Immature Female.—In first plumage the young female resembles the young male but is somewhat paler in colour, especially on the cheeks and throat. In October the adult plumage of the female begins to come in and proceeds gradually until the end of March, at which date it is complete. Young female Pochards will mate and breed in the first spring, but their plumage, like that of the male, is not in full beauty until the third year.

GENERAL DISTRIBUTION.—The Common Pochard is found generally throughout Europe and the temperate parts of Asia, including China, but does not extend to the Arctic regions. Throughout Central Europe, the British Isles, both sides of the Baltic, and east to the Black Sea and the temperate portions of Siberia, east to Spain, and north to Cyprus and North Africa, the Common Pochard is locally abundant. We find them nesting or in migration in large or small numbers according to the suitability or otherwise of the summer or winter habitat. There is not the least doubt that in Germany and the British Isles the species is rapidly increasing and extending its breeding range every year.

BREEDING RANGE: *Europe*.—The breeding habitat of the duck is chiefly in the Palæ-arctic region from the British Isles to Lake Baikal, and probably even further to the east.

Russia.—To 60° N., in the Petersburg Government, the Jaroslav, Kazan and S. Perm Governments, and near Tjumen (Buturlin in Dresser's *Eggs of Birds of Europe*, p. 567), Baltic Province (Russow), in the Government of Moscow (*J. F. O.*, 1909, p. 585), Finland, on Åland, and a few localities N. to lat. 63° (Dresser).

Scandinavia.—Not rare in South Norway in migration, but does not breed; in Sweden it is commoner and is said to have bred (Öland, Gotland, Östergötland, &c.) (Dresser).

Denmark.—Breeds regularly in small numbers (H. Winge and E. Schiöler.)

Germany.—Found breeding in Mecklenburg, Brunswick, Altenburg, E. Prussia, Saxony, E. Thuringia, Bavaria, Pomerania, Mark Brandenburg, Baden, and Silesia (Naumann).

Bavaria.—Breeds (Jäkel, *Vögel Bayerus*, p. 363), also North Germany (Hofmeyer, *J. F. O.*, 1872, p. 339).

Italy.—Somewhat doubtful, said to breed in Massaciuccoli (Gagnani), and was formerly believed to breed in the Venetian estuary (see *Arrigoni Manuale*, p. 742).

Hungary.—Breeds (Frivaldsky, *Aves Hungariae*, p. 164); generally common and breeding (*Madarasz*, p. 576); also breeds in Bohemia (*J. F. O.*, 1872, p. 371).

Spain.—Lilford, as quoted by Irby (*Orn. Straits, Gib.*), gives it as a breeding species; nests were found in the Marismas of Guadalquivir by H. Noble (*Ibis*, 1902), where these birds breed in fair numbers (Jourdain). A. Chapman (*Unexplored Spain*, p. 410) mentions it as breeding.

Holland.—A few pairs breed in N. Brabant (*Albarda*, p. 105); breeds in N. Brabant, Friesland, and N. Holland (*Van Oort*, p. 149); breeds commonly in one locality in Friesland (Capt. H. Lynes).

Balkan Peninsula.—Found nesting near Varna by P. Leverkahn (Stuart Baker, *Indian Ducks*, p. 222); breeds regularly in Roumania (Dombrowski). I suspect that it also breeds in Silesia and Southern Galicia, where I have seen old and young birds in September.

British Isles.—The principal breeding grounds of this species in England are the east coast counties from Northumberland to Kent. In addition to these, it is also known to nest in Herts, Essex, Beds, Dorset, Berks, Hants, Bucks, Sussex, Staffs, Lancs, and Notts. Both in England and Scotland the birds are extending their range every year, and I think it will not be long before they are found breeding in every suitable lake where they receive protection. In places where they were formerly autumn, winter, and spring migrants they now show a disposition to prolong their spring stay; and when we see courtship proceeding and flocks breaking in pairs, it is generally a sign that some of the birds will in future delay their departure and stop to breed. An instance of this is the Lake of Knepp, a sheet of water in West Sussex, that seems to be an ideal home for the birds. Formerly they were merely winter visitors. In 1910 they stayed till the end of March, in 1911 they courted and paired and left with evident reluctance, and this year several pairs have remained until April. Nests will probably be found this or next year. I have noticed the same in Staffordshire and Perthshire.

For many years the Common Pochard has nested in Norfolk (instances too numerous to quote), Yorkshire (Hornsea Mere), Lancashire, Dorset, and Hertfordshire, where they are numerous at Tring. It also breeds in Durham, Essex (since 1886, Christy, *Vict. Hist. of Essex*), Kent (*Birds of Kent*, Ticehurst, p. 361, and others), Berks (in Windsor Park, *Zool.*, 1908, p. 139), Bedfordshire (*Vict. Hist. Beds*, l. p. 125), Staffordshire (Gailey Pools, 1890, *Rep. N. Staffs. F. Club*, 1905-6, p. 49), Hants (since 1880, *Birds of Hants*,

p. 238), Lincoln (*British Birds*, ii. p. 95), Northumberland¹ (Tristram, *Vict. Hist. of Northumberland*), Sussex (*Field*, 12, v. 77, Borrer, and Millais, *Vict. Hist. of Sussex*), Notts, breeds at Thoresby Park and Newstead Abbey, probably also in other places (J. Whitaker), Bucks (*Vict. Hist. of Bucks*, i. p. 145).

With regard to W. Saunders' record (*Birds of Lancashire*, p. 173) of its breeding in Lancashire, Mr. F. C. Jourdain thinks that the birds which nested there were tame or semi-tame ones; but since the progeny of these return and *establish* the species in that area it is somewhat difficult to dissociate them now from wild ones. In the same manner the Wigeon has become an established breeding species throughout Yorkshire and Cumberland, owing their origin to a pair which bred with Sir R. Payne-Gallwey at Thirkeby Park, Yorks. He gave a pair to Mr. St. Quintin, who bred many, and in turn passed on others to Sir R. Graham at Netherby, Cumberland, who has now established it as a breeding species on a somewhat large scale. I have no doubt that that beautiful bird, the American Wigeon, could be established in similar fashion in the British Isles.

Once the first pair of breeding birds are established, their progeny seem to acquire a homing instinct, and it is easy to get them to pair and nest, and doubtless a large percentage of the Common Pochards now breeding throughout the British Isles owe their origin to tame birds which have nested.

Wales.—It is possible that it breeds in Anglesey (*Vert. Fauna of N. Wales*, p. 284).

Scotland.—Stirlingshire: I first obtained evidence of the Common Pochard breeding in Scotland in 1885 from receiving a young bird, unable to fly, from Mr. Winter, the keeper at Doune, who informed me that Common Pochards and Wigeon had bred for many years on Loch-ma-Haick; Perthshire: breeds in many small lochs throughout this county; two or three pairs used to breed regularly on the moors at Murthly, where I have seen several young birds unable to fly. It also breeds in the Black Loch, Taymount (see *Vert. Fauna, Tay*); Kinross: between the years 1879 and 1885 I saw no evidence of Common Pochard breeding on Loch Leven; about the year 1886 they commenced to breed, and now a few are said to breed there.² I think a pair or two also breed on the Loch of Lindowres. It also nests in Fife and Ross; Moray: a considerable number nest on Loch Spynie, in Elgin; nests on the loch at Kilravock, Nairnshire. It is somewhat curious that it has never been found breeding in Aberdeenshire, where it is abundant in winter (Sim). References of its nesting in the Border counties, Roxburgh and Berwickshire, are given by A. Chapman (*Bird Life of the Borders*, 2nd ed., p. 89-95). Wigtownshire (*A. S. N. H.*, 1901, p. 117). In the Outer Hebrides it nests occasionally at Balranald (N. Uist), where I killed young and old birds in August 1899. Mr. J. A. Harvie-Brown thinks it nested in Barra in 1894 (*A. S. N. H.*, 1902, p. 211). I think it also nests in South Uist; breeds in Tiree.

Mr. T. E. Buckley has stated that it bred in Hoy, Orkney, and it is possible it may breed in Sanday, where they are numerous in winter, and there is a lake suitable to its habits. It is a regular visitor to Shetland, but has not bred there.

Ireland.—The Common Pochard is very abundant on the large freshwater lakes of Ireland in the winter, and it is curious that more do not stay and breed there. Most of the

¹ Mr. Maurice Portal informs me that Pochards are breeding at Greenlea Loch, seven miles from Haltwhistle, this summer (1912).

² Mr. Maurice Portal informs me (May 1912) that as far as he could gather no Pochards were breeding at Loch Leven in 1912.

birds leave in March, but Messrs. Ussher and Warren (*Birds of Ireland*, pp. 203-204) mention it as having bred in the following counties: Kerry, Tipperary, Westmeath, Neath, Sligo, Down, Antrim. It has recently been identified as breeding in co. Monaghan (*Brit. Birds*, Dec. 1908, p. 248).

Asia: Asiatic Russia.—Buturlin (quoted by Dresser, *Eggs of Birds of Europe*, p. 567) gives Tomsk, Barnaul, Baikal, and probably N. Dauria as its breeding grounds.

Persia.—Probably breeds near Seistan (see *Jour. Bomb. N. H. Soc.*, xvi. p. 698; and *Ibis*, 1909, p. 283).

Africa: Algeria.—Breeds (*Ibis*, 1860, p. 81; also *Cat. Eggs Br. Mus.*, ii. p. 180).

MIGRATION RANGE.—In North Africa it frequents the lakes of Morocco (Irby, *Orn. Str. Gib.*, p. 226) and Algeria (Locke), where I have seen numbers to the east of Oran. It is also found in some numbers in Tunisia (Whitaker, *Birds of Tunisia*, ii. p. 214), and abundant in Egypt in winter (Shelley and C. Whymper). It is also found in the Canaries (Meade Waldo, *Ibis*, 1893, p. 199).

Asia.—In Palestine it is the commonest Duck (Tristram, *P. Z. S.*, 1864, p. 454, &c.), and is found in the South Caspian and Turkestan (*J. F. O.*, 1910, p. 72); the Asia Minor coast (*J. F. O.*, 1908, p. 283); Mesopotamia (Blanford, *Zool. E. Persia*, p. 302, and A. G. Tomlinson); N. Persia (Blanford); Kandahar (*Ibis*, 1882, p. 125); Quetta (*Ibis*, 1909, p. 283); Kashmir; very common in N. India, and less so in S. India (Hume and Stuart Baker); Burma (Harington); China; Japan (Seebohm's *Birds of Japanese Empire*, p. 254).

In Southern Europe the Common Pochard occurs chiefly on passage in autumn and spring. It is common on the Danube and fairly so in Northern Italy; Corsica in spring (Whitehead and F. C. R. Jourdain); Sardinia (*Ibis*, 1873, p. 344); Greece (Reiser, *Ornis Balc.*, iii. p. 504); Ionian Isles (Lilford). In Germany, on all open waters until the frost drives it south, and the north French estuaries and lakes.

It is only of casual occurrence in Northern Europe. It has been noted in the Faroes (1863, Reinhardt), and has once occurred in Iceland (Hantzsch, p. 183). In Southern Norway it is rare, but is more frequent in Sweden (Nilsson).

In England I have never seen the great flocks of Pochards that are to be seen at times in the large lakes of Scotland and Ireland. They are very common in the eastern counties, Norfolk especially, and large flocks may be seen on the Broads at times, but it is more usual to see, as we do in Sussex, bands of 20 to 50 on large pools or lakes, generally in March, or after a continuance of mild winter weather. All over the Midlands, Yorkshire, and Nottinghamshire this is the case, and flocks of a hundred and over are somewhat rare. If we wish to see large flocks of Common Pochard in the British Islands we must go to Scotland or Ireland, where on the great lakes acres of water are sometimes covered with the birds in late autumn and early spring. I have seen several thousands together on Loch Leven in October. In the estuaries of the Clyde and Tay, about Mugdrum, and on Loch Lomond and Loch Tay, I have noticed hundreds at one time, and after a spell of hard weather I have seen the bay of Musselburgh covered with Pochards. Here, of course, they had been driven by stress of weather, and would only remain a week or two waiting for a thaw. In the Western Isles, especially in S. Uist, large flocks of Pochards are sometimes seen, and often remain the whole winter (as there is little or

no frost there), as well as on the lakes of Wigtownshire and the Solway border. I have also seen immense flocks of Pochard on Loch Spynie (Elgin), and on the lochs of Strathbeg and Skene (Aberdeenshire). In Ireland Pochards sometimes visit Loughs Erne and Belfast in considerable numbers.

"The Pochard" (*Birds of Ireland*, p. 202) "visits every part of Ireland in winter, and is chiefly to be found on the inland lakes, on some of which, as on Lough Derg (Shannon) flocks of thousands have been reported. Marine inlets, like the fiords of Kerry and Lough Swilly in Donegal, are also frequented by this bird, but it flocks to the tide to a much greater extent when inland lakes are frozen.

"Sir R. Payne-Gallwey states that on some of the south-western estuaries he has seen five thousand collected after a gale, and on Lough Gill, near Castlegregory, fully three thousand, with Scaup and Golden-Eyes."

HABITS.—The home of the Pochard is large freshwater lakes, or big reed-enclosed swamps with deep water-pools in the centre, where they can dive for food and remain beyond the reach of the gun. They are not averse to still tidal estuaries, generally of brackish water, but seem to regard the sea itself merely as a place of refuge when driven from their true homes.

Such statements as "one of the most abundant species on the coast of Scotland" (Seebohm), and "I have never seen any number far away from salt water" (Lord Lilford), seem to me to betray a sad lack of knowledge of this bird. Rightly commenting on these statements, her Grace the Duchess of Bedford, in a letter to me, says: "I have been a great deal on the coast of Scotland up to December, and I do not think I have ever met with a Pochard in the sea or far down in an estuary. I counted 260 Pochards on one of our ponds a few days ago."

Where Pochards are most at home are large open stretches of fresh water that contain wide areas that are not of too great a depth. They seem to like lakes with rather muddy bottoms, where vegetation grows on pure sand, in which there is an abundance of water insects and much molluscæ. From such a centre they travel out at night to smaller ponds, and return at daybreak to their sanctuary. This proves that the Pochard is intelligent, and, like all diving ducks, first considers its safety and then its food supply. In migration time, single birds or a few together may be found in quite small pools, but they never stay long in such places, but pass on until they find safety in numbers. As a rule, Pochards keep well to the centre of a lake or offshore during the day, and are only to be seen diving near reed-beds or close to the banks of sluggish rivers, where they receive continuous protection. They are at all times suspicious of man, and at once swim for deep water on the least alarm. Even during gales they like to keep just out of shot of shore on the edge, as it were, of rough water, and take just as much advantage of bank shelter as is compatible with safety. This sense of caution is also evinced in their methods of going ashore to sleep and preen, for they generally choose some gentle shallow or low sloping island over which some members of the flock can see at all times, and on which the rest of the flock can rest at midday. On smaller pools they show an affection for those small green islands round which the muddy bottom produces an abundance of plant growth. Where constantly protected, it is common to see them in close proximity to the rushy banks where alders and willows grow and keep off the winds. Like all ducks, they seem to dislike a draught, and avoid wind-swept areas of water.

British Diving Ducks

Generally busy feeding at night, they like to rest and sleep a great part of the day with bill tucked into the shoulder feathers. In this attitude they remain for hours half asleep, but not so soundly that they avoid using their feet to maintain their position in the same spot.

It has often struck me, in watching a flock of Pochards, that there is always an unusual preponderance of males, and a party can usually be recognised at a considerable distance by the red heads and shining lead-blue bills of the males. Females and young are always more difficult to distinguish from other ducks owing to their more uniform colour. With their feet so far to the rear they walk with a decided roll, keeping the body in a fairly vertical position. But when standing still or taking alarm ashore, they raise the breast and assume a somewhat upright attitude. They never stay long on land, on which they appear to be little at home, but on the water they are expert swimmers and quick in all their movements. They swim deep, with the tail trailing in the water, and when engaged in diving further sink the body, depress the tail under water, and even allow the water to wash over the mantle.

In diving, their leg-push is powerful and creates a considerable swirl after the bird passes out of sight. The bird swims rapidly to the bottom and probes in every direction for food, staying under as long as a minute, and then floating quickly to the surface with legs stationary on either side. Generally they come to the top in very nearly the same place at which they have dived. Nearly all their food is swallowed where it is found, but I have seen them bring fish to the surface, where it is passed across the bill several times until rendered soft enough to swallow whole. Certain roots are also treated in the same fashion. Naumann states that Pochards can remain under water for "nearly three minutes." This may be possible, but I have never timed one, even in confinement, to stay so long beneath the water.

Their flight is rapid and "scurrying." The wings, not being large, have to be beaten quickly to bear the weight of the body, and the pace is not very swift. It is accompanied by a rushing sound; the birds fly very close together in a somewhat compact mass. When high in the air they often assume a V-formation, as if desirous of being led by some experienced individual, and the whole flock sometimes indulge in a remarkable "header," or plunge from the sky down to some sheet of water where they wish to alight. They cannot rise easily from the water unless there is a considerable breeze, and sometimes scurry along the surface for some distance before getting under weigh. They also alight on the water somewhat clumsily. In the air they are readily recognised by the large head, body, and feet, short stumpy tail, and short wings. Although this duck may be said to be cautious on large sheets of water, it is not a difficult bird to approach even in large flocks, especially in a small sailing-boat, and this may be due to its disinclination to fly, especially as it must come *upwind* towards the point of disturbance. I have sailed right in amongst Pochards and Scaup in October before putting them to flight. On small ponds they show even greater tameness, and, if undisturbed, will often consort with pinioned birds and tame species, and soon become as tame as domestic ducks. There are many instances of wild Pochards joining domesticated ducks, and remaining with them for months.

I have never found Pochards on the sea in Scotland except during hard frosts. A few days of 10° below freezing-point and I was certain to find Pochards on the Moray Firth,

where I shot with the big gun for three seasons, and if the frost continued for more than ten days the birds left for the winter, most probably for the open water of the south-west, not returning until the lakes were open in March.

Whilst swimming, flying, or under excitement the male makes use of a hoarse "karr-karr-karr" note, that of the female being deeper like "kurr-kurr-kurr." Sometimes the call is repeated four or five times. This cry on the part of the male is, however, quite different from the note used during courtship or the groaning wheeze which it utters as a low call-note to attract attention.

The principal food in summer and autumn is vegetable and freshwater molluscs. They eat large quantities of the roots, seeds, leaves, and flowers of aquatic plants, which they take and swallow at the bottom. They are especially fond of the seeds of *Polygonum amphibium*, and, in the autumn, of the seeds of *Potamogeton marinus* and *P. pectinatus*, also the tender parts of *Myriophyllum*.

In confinement they refuse many hard foods such as acorns, &c., which surface-feeding ducks will eat with avidity.

In summer the young birds eat quantities of floating insects, but the old birds seem to take few of these, although they catch numbers of water beetles, small fish, tadpoles, and small frogs. With their liking for seeds of all kinds, it is not difficult to get Pochards to feed on any sort of grain or bird seeds. Like other diving ducks, they swallow a considerable quantity of sand or small stones to assist digestion.

Pochards seldom go on land to feed unless upon some mound of mud and water-reeds which drought or a falling lake has exposed. They also seldom tip up the hind part of the body to reach food with the bill. They are not averse, however, to taking floating seeds and insects off the surface of the water.

The Pochards that intend to nest within a certain area follow the general rule of all diving ducks and arrive in one flock, generally on the largest sheet of open fresh water in the neighbourhood from the 10th to the 15th of March, or even later if the weather is still inclement. The curious groaning wheeze of the male may now be frequently heard, and courtship commences. The finest coloured males being those of two years or over, are always the first to pair, and drive off the young males which, at a distance, may appear to be adult. The latter remain in a flock apart and seem to be easily discouraged from paying attention to the females. If, however, there is not a preponderance of males, as there usually is in the case of this duck, these young males will often pair with the females, who are quite ready to make love to them.

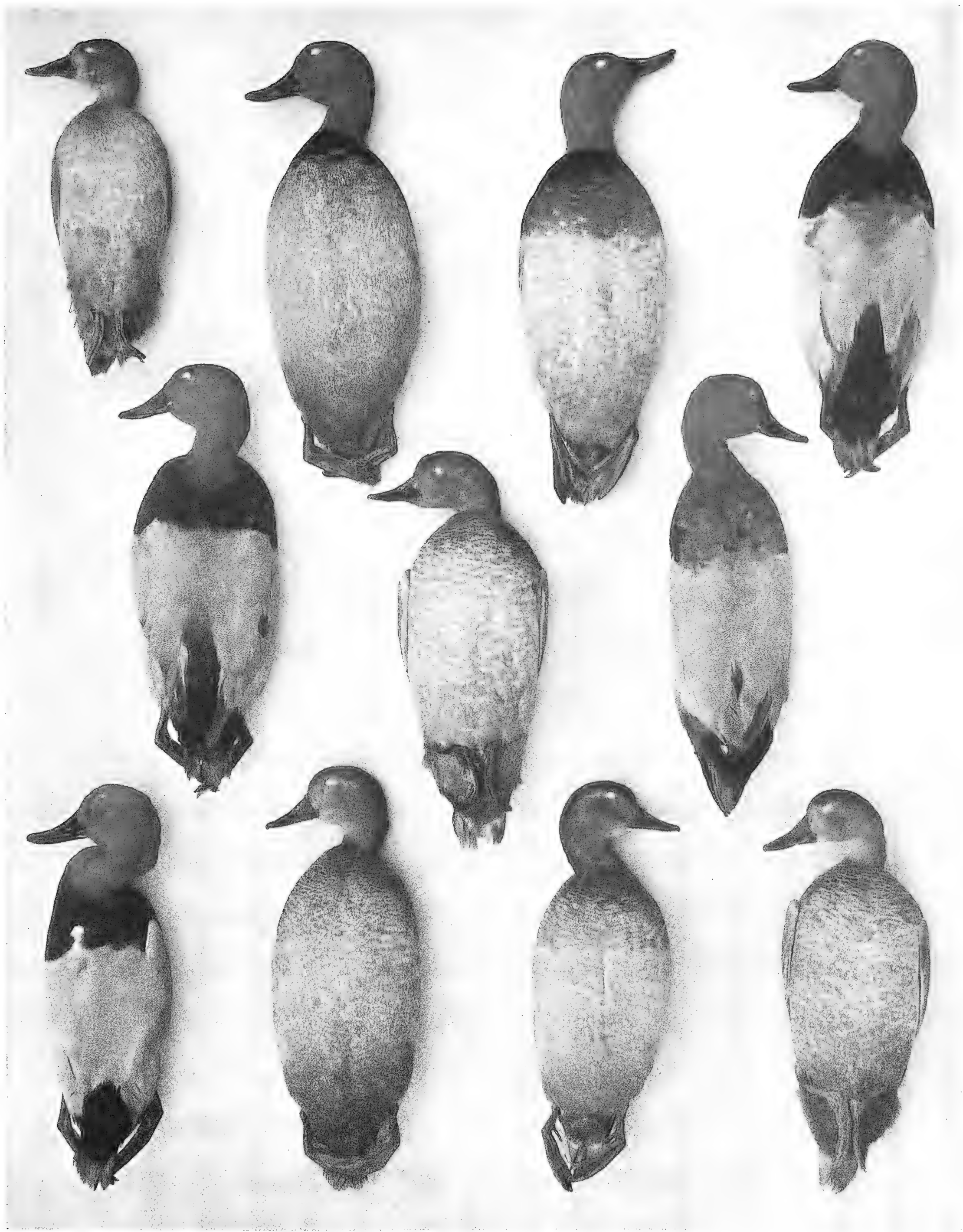
Beyond a remark in Dresser (*Birds of Europe*, p. 554) to the effect that a male "would extend himself at full length on the water and utter the softest of sounds," I have read no description of the courtship of the Pochard, which is certainly an attractive one. At the commencement of courtship, generally on the first warm day, several males are to be seen showing off before one duck. In most birds, pairing is generally due to the disposition on the part of the female to *accept* attentions, and you will usually notice that some particular female is in advance of the rest of her sex in this respect. As I have shown in my drawing, which is done direct from life, four or five males are crowding round one female who, in turn, circles round some male, dipping her bill in the water, stretching her neck low on the water, and occasionally uttering her coarse cry of "kurr-kurr-kurr." The

males continuously keep up their curious groan, which is somewhat like a man affected with asthma and being told by the doctor to "take a deep breath." In addition to this call, they also utter a soft low whistle, which the spectator must be close at hand to hear. The first attitude of the male consists in throwing the head and neck back until the back of the head touches a point between the shoulders. This is repeated constantly at the commencement of courtship. The more common display is to blow the neck out with air, with the head raised horizontally, and utter the groan as the air is released. During this show a distinct "kink" is to be observed in the lower part of the neck, whilst the centre is unusually swollen. The fullest display is usually performed as the male approaches the female. The male then lies very flat on the water and stretches the head and neck to the fullest extent, at the same time blowing out the neck and frequently turning the head on one side so as to display its full beauty. Two or three males may thus often be seen together laying themselves out to attract the female's attention, and the effect is somewhat striking. During these moments of intense excitement the pupil of the eye of the male nearly disappears, and the eye itself seems to blaze a very rich lacquer red. It is often the case that even after pairing has taken place bad weather sets in and the pairs of Pochards separate, but with the recurrence of finer conditions many of the ducks at once re-pair and leave the central lake and seek out smaller ponds and lakes in the vicinity where they intend to nest.

In the breeding season Pochards seem to prefer small lakes whose sides are overgrown with dense vegetation or even large reed-beds. Small islands are also very attractive to them, but, if absent, they will seek out nesting sites that run into meadows of sedge and grass, from which flow channels connected with the main pools. They are not at this season averse to the close proximity of man, and the pair of birds keep very close together until the female commences to sit. The nest is usually built just above the level of the water on the edge of a clump of reeds where the soil is firm, or in the centre of a small island. As a rule, it is entirely covered with undergrowth and well lined with down (in *British Birds*, ii. p. 23). The female usually deposits from 7 to 9 eggs. Leverkäl'n records one nest of 10 eggs and Saunders (*Manual*, p. 444) and Naumann one each of 13 eggs, whilst Professor Newton had a clutch of 14 eggs sent from Yorkshire, probably the result of two females laying in the same nest. Full clutches are usually to be found in England in the first or second week in May, and the second week in May in Germany, and third week in May in Scotland.

"The female shows great devotion," says Naumann, "during the time of sitting. She approaches the nest with caution, flies past it accompanied by the male without however circling round it, lowers herself with the male on to the water at some distance away from it, and both sit there motionless for some time, with very erect necks, until finally the female, swimming in an attitude of diving, or running, hurries back to it. The male meanwhile remains on the open water close by and warns her of the approach of any danger with a loud gabbling cry, but is always the first to take to flight, and later on, when the sitting is over, troubles himself no more about her, stays in the day time far away from her on the open water near, and only comes back to her in the evening if she leaves the nest for a rest."

The female keeps adding down, plucked from her own breast, to her nest as incubation proceeds, until there is a considerable quantity deposited, and with this she covers the eggs carefully if she leaves the nest.



PLUMAGES OF THE COMMON POCHARD.

1. Immature male; first plumage. Murtly, Perth. Aug. 12th, 1890. Age, 1 month and 12 days.
2. Immature male; backward bird. Campbelltown Bay, Moray Firth. Jan. 2nd, 1890. Age, 6 months and 2 days.
3. Immature male. Possil Marsh, Glasgow. Dec. 20th, 1888. Age, 5 months and 20 days.
4. Immature male. Campbelltown Bay, Moray Firth. Jan. 2nd 1890. Age, 6 months and 2 days. Breast full of immature feathers.
5. Immature male. Loch Flemington, Nairn. Jan. 30th, 1890. Age, 7 months.
6. Adult male; full eclipse. Loch Flemington, Nairn. Aug. 1st, 1890.
7. Adult male; changing from eclipse to winter plumage. River Tay, Perth. Nov. 1st, 1882.
8. Adult male. Lynn, Norfolk, March, 1884.
9. Immature female. Campbelltown Bay, Moray Firth. Jan. 2nd, 1890. Age, 6 months and 2 days.
10. Adult female; winter plumage. Loch Flemington, Nairn. Dec. 1890.
11. Adult female; breeding dress. Loch Flemington, Nairn. Aug. 1st, 1890.

Mr. Heatley Noble sends me the following interesting note to the effect that the female sometimes deposits no down in the nest: "I found several nests at Loch Spynie, near Elgin, and even when the eggs were on the point of hatching there was not one particle of down. All the nests were in rushes, the nest itself being very much like that of the Coot, and surrounded by water. Other nests that I have seen both in this country and in Spain or Hungary contained the usual amount of down."

On the other hand, Captain Brander Dunbar, the owner of Loch Spynie, writes (May 4, 1912): "About a score of pairs of Pochard breed regularly on Loch Spynie, and personally I have never seen one nest without down." Wherefore the fact that Mr. Heatley Noble found nests there without down must be regarded as something very unusual.

Mr. Gerald Legge sends me the following note descriptive of a female Pochard going on to her nest: "To-day (June 7, 1912) I watched my female Pochard go on to her nest. She is very tame, so I waited at a distance of one yard. Soon she came and sat on the edge of the nest for two minutes, all the time keeping up a gentle 'crooning' to herself. Then she settled down on the nest without uncovering the down from the eggs. After sitting for about one minute she turned half round, and with one leg pushed some of the covering of the eggs to the side and edge of the nest. She then made another half-turn on the other side, and pushed more down on to the edge. Both times the movement was effected by stretching her leg out behind with toes and webs spread."

When the eggs are ready to be hatched she is very tame, and leaves the nest and its vicinity with great reluctance when disturbed. I was able to stroke a female in a nest found on Loch Spynie on May 1891 without causing her to leave the place. Observers seem to be agreed that the young do not leave the nest until the day after they are hatched, and they are then tended with the most assiduous care by the mother. At first she keeps them close to the edge of the reeds, especially if there is any wind, and dives for food, which she breaks up and offers to them. Very soon they learn to catch flies and pick up floating seeds, and they may be seen diving of their own accord when only a day or two old. The cry of the young is a gentle "peep," which they emit until fully fledged and able to fly. From early days the young are expert divers, and soon learn to escape by that method if threatened with danger, but on first alarm they pack closely together, as if for mutual protection. Before reaching full powers of flight, Pochards, as well as other ducks which nest in Central Europe, have many enemies to contend with. No doubt large pike kill them in numbers. Rats and others account for a certain number. Whilst Hen and (on the Continent) Marsh Harriers account for a few. Magpies, Carrion and Hooded Crows search out the nests and destroy the eggs.

About the beginning of June the adult males show a disposition to desert the females, and to form into small bachelor parties, and by the middle of that month they usually desert the home lake and wander off to quiet and open sheets of water where there are no nesting females. In July and August these males, now in eclipse dress, are most difficult to find, and I spent several seasons in fruitless hunts for them before I could obtain specimens which were unknown in this country to collectors. Though many Pochards were nesting in Nairn and Elgin, I could not discover a single old male in July 1890, and it was not until the 31st July 1891 that I spied a small party of old males on the Loch of Flemington, a bare reedless loch near Gollanfield, Nairn. Before daybreak on the following

morning I took my gunning punt from Fort George, a distance of four miles, and, paddling to the birds just as the light came, I killed four out of the five males, all in fine eclipse plumage. Most of the females and young do not leave their home lakes until the middle of August, and I have killed young birds unable to fly on August 12th at Murthly Moss. The old females had usually left by that date. In September Pochards are on migration all over our islands, and do not form up into big flocks on the large lakes until the end of October.

Although Pochards both young and old may sometimes be found in late August and September when on migration, I am convinced that not one-tenth of the birds that are bred in the British Islands are to be found anywhere in the vicinity of either their regular summer or winter haunts during this period. It has always been a puzzle to me where they go to from August 12th, when they desert the breeding lochs, till October 15th, when they begin to reassemble at their regular winter habitats. In Scotland, where they are common at nearly all other times, it is nearly impossible to find Pochards in September. Certainly they do not go to sea or to the large lakes of the vicinity, and the small numbers noticed on migration are usually single birds, or small parties, which in no degree represent the local stock that have bred. We can only infer that the main stock of birds passes away from our shores to other lands in the south and does not return till October. Commenting on this, Captain Brander Dunbar, a close student of ducks, writes to me: "It is a very curious fact that all Pochards disappear from the loch (Spynie) from the middle of August till the time of the winter flights. When fishing in July I often see a dozen good-sized broods, say 120 birds; these leave as soon as they can fly, about 12th August, but it is a mystery to me where they go to."

CAPTURE.—When found on small ponds Pochards are by no means shy, and will generally allow a gunner to walk within gunshot if simple precautions are taken, but it is a mistake to shoot these birds in such places if there is a desire on the part of the landowner to establish the species as a resident, for all ducks soon learn the spots where they are protected, and will not tolerate much molestation. If specimens are required, or the needs of the pot are pressing, it is much better to attack the birds on large sheets of water or on the estuaries, which they are not easily made to forsake. In the autumn these large flocks are easily approached by a small sailing-boat to within gunshot of an 8-bore, or even a full choke 12-bore, but if numbers are wanted the punt gun will do great execution in their serried ranks. I have seldom fired at Pochards on the sea, but one frosty morning in February 1891, when returning from an unsuccessful raid on the Wigeon in Castle-Stuart Bay, Moray Firth, I spied a small but dense flock of duck in Campbeltown Bay, not far from the village. These were about sixty Pochards driven to the sea by stress of weather from the various Nairnshire lochs. Knowing that they would be tame and had doubtless never seen a punt, I reserved fire until I was within 80 yards, and cut a clear lane right through the flock, killing dead twenty birds, and afterwards recovering two winged ones. On the East Coast of Scotland such a shot with the big gun is rare, but I have seen occasions on Loch Leven (where Heaven forbid! a punt-gun should ever be used) and the Loch of Strathbeg when a very much larger number of birds could easily have been killed.

There are sometimes good opportunities of getting a shot at these ducks at flight,



W. Walter L. Collis, So.

Common Pochard and Scaup Duck about to settle.

when they leave the estuaries or large lakes, and pass out to feed on smaller sheets of water at dusk. I was once waiting at a point on the Island of Mugdrum, Tay estuary, when, hearing a rush of wings, I looked up, and had just time to snap two barrels into a flock of duck that passed on my left; the result was six Pochards down, but I lost two in the darkness. If it is desired to shoot Pochards on a small lake, it is much better to drive them off it, and station the gun or guns away from the water, as this form of shooting does not seem to terrify them nearly so much as stalking them from the shore. They are not more or less difficult to kill than other diving ducks, but require to be hit well forward, as winged birds may give much trouble.

On large sheets of water they seem only to be shy when accompanied by other species, such as Scaup and Golden-Eyes, or Coots. Any of the latter, which are always more or less suspicious of danger, rising in their vicinity will disturb Pochards and make them wild. Golden-Eyes are in fact the veritable bugbear of the punt shooter, and ruin two-thirds of the chances offered, in Scotland at any rate. I have watched the punt and shoulder gunners attacking the immense flocks of American Pochards on the St. Lawrence, between Quebec and Rimouski, in November, and have noticed that the flocks, which often number many thousands, never travel very far after being fired at. This is probably due to the absence of other species, as well as to the fact that the birds had just arrived. When the weather is still the noise of a flock, often of thousands, rising is like the sound of big breakers crashing on a rocky coast. I have also seen vast numbers of American Pochard on the brackish lakes between Winnipeg and Calgary. Local gunners consider it a poor morning when they cannot shoot at flight 50 to 100 of these ducks. In that duck paradise, the shores of Chesapeake Bay, the "Red-head," as the American Pochard is always called, come in vast numbers in November, and feed on the wild celery, which gives to their flesh a flavour only second in excellence to the renowned Canvas-back. Great numbers are killed here for market by means of decoys, reflectors, and sink-boats.

When the ice forms in the far north enormous flocks of Red-heads take up a temporary residence in the St. Lawrence, and the smaller lakes that drain into the Great Lakes, and the larger western rivers. They avoid New England, and gradually descend in tens of thousands to that great duck paradise, the Chesapeake shores, and the lagoons of the Western States, where they pass the winter. Here they feed on the wild celery or *Vallisneria*, and so gain a peculiar delicacy of their flesh. In regions where the eel-grass does not grow—as in California for example—the Red-heads live on fish, lizards, tadpoles, and coarse aquatic plants, and in consequence are uneatable, whereas in the Mississippi Valley and the Chesapeake, where the wild celery is abundant, gunners kill thousands to meet the demand.

When they first arrive, Red-heads, flying in a compact body along the coast, make a noise like thunder or breaking waves, as their strong wings beat the air in unison. When they alight on the water above their feeding-grounds they are very restless and alert, constantly wheeling about in the air to reconnoitre before settling down. If decoyed to the coast or reed lines at daybreak by gunners screened behind "blinds," or "tolled" (called) within range, the flock, after being fired at, quickly retreat to open waters.

Myriads of Red-heads are also found in Minnesota, Dakota, and Montana in the

autumn, whilst great numbers breed in the prairie-sloughs of these States, and up in Manitoba, Saskatchewan, and Alberta. Of their further distribution I need not speak, as they cannot, properly speaking, be considered the same as the Common Pochard.

In winter in India the Common Pochard assembles in numbers on the great jheels, morasses, and lakes, part open water and part morasses and jungle, and British sportsmen kill large numbers.

When killed on fresh water where there is good feeding, the Common and the American Pochard are by far the best birds for the table of any of the diving ducks. There is a tenderness and delicacy about the flesh that renders it highly popular with the gourmand, and I have eaten "Red-heads" in Delmonico's restaurant in New York which, with perfect cooking, seemed to be quite as good as the more expensive Canvas-back. So particular, indeed, are some American gentlemen as to the cooking of this bird, that a second or two longer or less before the fire is said to spoil the dish. A story is told in New York of one gourmet who, after looking at the bird before him, called his negro butler and said, "John, pass this once again through the *kitchen*."

Certain parasitic insects of the genera *Dolophorus* and *Lipeurus*, which also occur in other species, are found in the feathers of the Common Pochard, and in the entrails worms of the genera *tænia* and *distanum* are found in numbers.

In Germany numbers of these ducks are captured by means of nets hung vertically under the water. A few are also taken in Lincolnshire and Holland by means of the stand-net fixed on the sands, but they are seldom captured in the decoy-pipes of this country, owing to their habit of keeping away from the land in an off-shore breeze, which brings surface-feeders in to their destruction.

The Common Pochard is one of the easiest of ducks to keep in confinement, and will live for many years on a grain-food diet, varied with duckweed and such natural food as a pond may afford. They soon become tame, and if kept with other species that do not molest them, they will breed freely in confinement. The young are also easy to rear. Mr. E. Knight (*Field*, July 23, 1910) records the fact that he has kept a male Pochard in confinement at Keswick Old Hall, Norwich, for thirteen and a half years. Mr. Meade Waldo (*British Birds*, iii. p. 116) says he has kept a female Pochard for twenty-two years, and that she reared a brood annually for twenty years.

The Common Pochard has crossed with several species of ducks. Several hybrids between this species and the Ferruginous Duck are known. The first to occur in this country was, I believe, shot by Colonel Paget, in Norfolk, about 1860. The bird passed into the collection of Frederick Bond, and at the sale of his collection at his death I purchased it. Other examples, all I think males, were shot at Rollesby Broad, Norfolk (W. R. Fisher, *Zool.*, pp. 1137-1778), now in the possession of J. H. Gurney, who has another example, killed in the same county (February 1859). A third example is in the Booth collection, Brighton; and a fourth, caught alive at Saham Toney here, lived for some time at Keswick Hall, Norwich; the last example, a beautiful male, now before me, was shot by a local gunner at Potter Heigham, Norfolk, in the later part of March 1909, and was exhibited at the meeting of the B. O. C., June 16, 1909, by the Hon. E. Montagu. The two males, my own specimen and that kindly lent to me by Mr. Montagu, are almost exactly similar. Head and neck, deep red brown, a little darker than Common Pochard; bill, similar

to the last named; the neck and breast-shield black, with a suffusion of red brown; belly, white; flanks, vent, thighs, nape, scapulars greyish-brown, finely vermiculated with black; primaries, secondaries, and upper wing, similar to Ferruginous Duck; wing-coverts grey, with broad black edges to the feathers; under tail-coverts white, like Ferruginous Duck; upper back black and finely vermiculated with grey; rump, black; tail and primaries brown, with a greyish sheen. Naumann described the hybrid as *F. homeyeri*. It has also been named *F. ferinoides*.

At the meeting of the Zoological Society (*P. Z. S.*, 1882, p. 134) Dr. P. L. Sclater exhibited, on behalf of Mr. Peter Inchbald, a specimen of a hybrid between the Common Pochard and the Mallard. It was probably bred in confinement. In the *Field*, May 27, 1909, Mr. W. Mackay Wood reports having bred three young hybrids of a similar kind at the Lodge, Brinscall, Lancashire. I can record another instance which occurred in the summer of 1898, at Reevesby Abbey, near Woodhall Spa, Lincolnshire. A wild Mallard came to a small pond there and paired with a pinioned female Common Pochard. Five young were hatched and reared—three males and two females—and four had been given away when I saw the last, a male, at Reevesby, in August 1899. The bird was exactly intermediate between the two species. Speaking of these hybrids bred at Brinscall, Mr. Wood says:—

“In general appearance they are quite unlike any duck I know. In shape they take after the mallard, but are smaller and rounder. In the drake the bill is like the pochard's; the head and upper part of the neck are a glossy greenish-black, which in some lights is strongly shot with red; the white neck-ring of the mallard is absent; the breast, under parts, tail, and tail-coverts resemble the mallard, whilst the upper parts of the body take after the pochard, except for a well-defined wing bar and the absence of curl in the middle tail feathers. The ducks are of a dull dusky brown, dark on the top and light underneath, without the dark markings of the wild duck. In both sexes the irides are brown, the legs and feet dull orange, the webs greyish-black, and the tail contains sixteen feathers.”

The Common Pochard has also bred with the Sheld-Duck in confinement, of which L.T. C. (*Field*, Dec. 30, 1911) says:—

“The following are the particulars of an interesting hybrid hatched at Christ Church Park, Ipswich, last year, 1910, and is now in good plumage. The male parent is a common pochard, the female a common sheld-duck. The hybrid greatly favours the pochard, but is larger and longer and much more graceful. Colour of head, blackish chestnut; eyes, dark brown; neck and breast, lighter chestnut; belly and sides, light pencilled grey; back, darker pencilled grey; primaries, dark grey; tail, nearly black; vent and under tail-coverts, yellow; bill, black, slightly curved upwards; feet, slatey.”

FERRUGINOUS DUCK

Nyroca nyroca (Güldenstadt)

- Anas nyroca*, Güld., Nov. Comm. Petrop., xiv. p. 403 (1769).
Sarcelle D'Egypte, Buff, Pl. Enl., x. pl. 1000 (1784).
African Teal, Lath., Gen. Syn., iii. pt. 2, p. 555 (1785).
Anas Africana, Gmel., Syst. Nat., i. p. 522 (1788).
Ferruginous Duck, Lath., Gen. Syn., iii. pt. 2, p. 526 (1785).
Anus ferruginea, Gm., Syst. Nat., i. p. 528 (1788).
Anus leucophthalmus, Bechst., Orn. Taschemb., i. p. 450 (1802).
Anas glaucion, Pall, Zoogr. Rosso-Asiat., ii. p. 268 (1811).
Aythya nyroca, Boie, Isis., 1822, p. 564.
Fuligula nyroca, Steph., Gen. Zool., xii. p. 201, pl. 55 (1824). Yarrell, 4th ed., &c.
Nyroca leucophthalmos, Fleming, Brit. An., p. 121 (1828).
Athya leucophthalmos, Brehm, Vög. Deutschl., p. 917 (1831).
Anas nyroca, Naumann, Vög. Deutschl., 2nd ed., xii. p. 41 (1844). Schlegel, &c.
Nyroca obsoleta, Brehm, Naumannia, 1855, p. 298.
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Nyroca nyroca leucophthalmos, Privaldszky, Av. Hung., p. 165 (1896).
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LOCAL NAMES.—White-eyed Pochard, White-eyed Poker, White-eye, White-eyed Duck, Ferruginous Duck (*English*); Schetrusi (*Arabic*); Plavka (*Bulgarian*); Patka Njorka, Patka bjelokrila (*Croatian*); Polak maly (*Czechish*); Crnin (*Dalmatian*); Hvidöiet And (*Danish*); Baltatschu pihle (*Esthonian*); Fuligule nyroce, sarcelle rousse, bouice raughe, Canard hongrois (*French*); Zuta norva (*Herzegovinian*); Witoog (*Dutch*); Akajahiro (*Japanese*); Moretta tabaccata, Tuffetto tuffatore, Colletto, &c. (*Italian*); Braimla (*Maltese*); Zirigueil (*Moorish*); Cruka (*Montenegrin*); Kaczka ponur (*Polish*); Lurro (*Portuguese*); Ootka nyrok (*Russian*); Negrete, Anach chaculatur, Rochet, Coquinero, Zarro (*Spanish*); Gzigany recze (*Hungarian*).

Egg.—Generally pale brown, sometimes with a faint yellow or greenish tint. In shape a long oval, though Hume states that they are "occasionally considerably elongated, and slightly compressed towards one end." Length from 1.9 to 2.2 inches; breadth 1.4 to 1.54 inch. Mr. Stuart Baker (*Indian Ducks*) states that his series of eggs average 2.12×1.45 , showing them to be rather narrower and longer than the Hume series. The number laid is between 6 and 10, but occasionally 12 to 14, and even 20 (Von Madaraz), the last record being probably the results of two females laying in the same nest.

Nestling in Down.—Upper parts a rich dark brown, being slightly lighter in the centre of the back. This colour is extended to the lower breast and belly and vent; faint yellowish edging to the wings. Cheeks, chin, neck, and breast rich sandy yellow. A very small line of brown extends from the bill to eye, and just beyond; a small brown spot is also found near the ear; bill slatey-blue black with tip lower mandible and lower edge of upper mandible bright bone yellow. Feet slatey-blue black with yellowish spots along the toes (F. E. Blaauw) (nestling taken Tyck, Hungary, June 17, 1903); see figure in plate of young in down.



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FERRUGINOUS DUCK
adult male and female

Young Male in First Plumage.—Can be somewhat easily confused with the young Tufted, but is recognised at once by the shape of the bill, which is much narrower, and the colour of the secondaries. In the Ferruginous Duck the black lines on the outer edges of the white are very faint or altogether absent, whilst in the Tufted immature they are strong and well defined. The feathers immediately behind the upper mandible are never so pale as in the young Tufted. The bird is also somewhat smaller. On the lower belly there are a large number of pale brown feathers edged with white.

In the nestling stage the irides are grey, when half grown they are grey-brown. From September until November the irides are dark brown, and then in the young male they develop an ash-grey outer rim, which increases in the following months until by late March the irides are pearl-grey. In the second year they are pearl-white. The bill is slatey blue black, lighter towards the nail. Feet lead-blue with a greenish shade which disappears in March. Head without crest; no white spot on the chin; head and neck, dark rusty brown; brow, crown, and back of neck, blackish-brown; breast white, with grey-brown under parts of the feathers showing in numbers; belly, thighs, brown; under tail-coverts, white; upper back, black-brown with faded brown edges; lower back and rump, blackish-brown; wing-coverts and tertiaries dull greenish brown-black; secondaries, white and brown-black at the ends; primaries similar to adults but paler; tail, frayed at the ends and rusty brown. Young males are distinguished from females by their superior size and by the redder almost coppery-red flanks. The head and neck as well as the back are much darker.

Adult Male.—Head, neck, and upper breast a rich chestnut brown; very dark brown where the neck joins the mantle; bright white spot on the chin; back and wing-coverts amber brown with a slight tinge of green; primary quills black with inner webs white; the secondaries have a broad white patch finely edged with dark brown, the lower parts of these feathers are dark brown edged with white; flanks dark chestnut-brown. There is a considerable difference, probably due to age, in the amount of the fine grey vermiculations suffused with grey that appear on the brown scapulars; tail and rump brownish black; lower breast and belly, white; vent brown and vermiculated; under tail-coverts pure white; legs and feet plumbeous black; irides, white. Length 16 in.; wing 7.75 in.

Adult Male in Eclipse.—As we should expect, the male Ferruginous Duck has a distinct eclipse plumage which it commences to assume about the 15th of July. I kept two adult males for the purpose of ascertaining this fact, and killed them respectively on July 30, 1901, and August 20, 1901. I found that the change was exactly similar to that undergone by the male Tufted Duck. The greater part of the plumage is only renewed once, the winter feathers coming in on the breast brownish heavily edged with white, but, in addition to these, a number of temporary feathers (which are again shed in October) appear on the sides of the breast, flanks, and sides of the lower belly, which are heavily barred or edged with grey. The most noticeable change, however, is in the whole of the head and lower neck. The former becomes a dull and pale red-brown; the latter, which is almost black, is edged with white or sandy brown. The wings, scapulars, back, tail-coverts are only renewed once, and are in every way similar to this bird in spring dress. The eye loses much of its brightness, but does not change colour.

Immature Female.—Head and neck a somewhat dull dark-brown; upper breast dark

brown with sandy-brown edges to the feathers; the belly is sometimes white, but usually shows numerous brown upper parts to the feathers, which give it a spotted appearance. The tail and primaries are not nearly so rich or dark as in adults, and as the season advances these parts become pale and worn. In March the greater part of the plumage is renewed, and it is scarcely possible to tell some young birds from old, whereas others retain much of the juvenile plumage. The rump, however, is never so dark as in females of over two years. Immature females seldom breed in the first spring, but I have known instances of them doing so.

Adult Female resembles the male closely, but head, neck, upper breast, and flanks are not nearly of so rich a chestnut brown. The breast is seldom pure white like the male, and the brown flank feathers extend farther into the breast. In full winter the brown of the upper breast is edged with sandy-white, but this disappears by the end of March, and the whole of the chest is a clearly defined band of red brown. The grey vermiculations on the upper scapulars are not nearly so clear as in the male, but those on the thighs and on the brown of the lower belly are similar to the male. The white vent is also similar to the male. As is the case in all the adult female diving ducks, the females wear off the white end of the belly feathers and also have a number of new brown feathers on the breast in the nesting time, so that the bird bears a very dark appearance at this season, but not so dark as the Tufted Duck.

The legs and feet are bluish-black. At all seasons the female can be identified from the male by its red-brown eye, but with advancing age the irides become whiter and eventually quite white. The white spot on the chin is similar to the male, and the vent is brown and under tail-coverts white. Length $15\frac{1}{2}$ inches.

I find that Naumann's views with regard to the moults and breeding periods coincide with my observations of this species, both in a wild state and in confinement. He says:—

“At the beginning of July the males begin to moult, and have got through it in the following month, and now have, too, new wing and tail feathers and their less showy summer plumage in place of the glory dress (the summer one). This is at its best in September. I have myself killed one such male on the 27th Sept. which had this summer plumage at its freshest stage, both with regard to the feathers and their colours. But by the middle of October the second moulting has begun,¹ which, within four to six weeks, gives them a new glory dress, which does not, however, extend beyond pinion and tail feathers. The young males, too, now (somewhat later than the adult males) lose their feathers in order to assume their first mating, or glory dress, but with these the process is a much slower one, so that some have not got it completely when they take their places at the breeding haunts in the spring. The females moult only once every year, as a rule, early in August, when the young are reared, and the young females keep their young-bird plumage until the following spring, and then moult for the first time in the second summer of their existence at the same time as the adult females do.

They breed, accordingly, as a rule while still in the young-bird plumage; it is thus only young females belonging to a belated brood which are often unable to fly by September (though others can normally do this in August) which may possibly remain unmated in the next spring, or perhaps arrive at that stage later than others, for such birds are often seen wandering about alone in unfrequented places in May, and a few years ago I killed one such female on May 3rd at the pond here, but it was a remarkably small specimen and its ovary was very little developed, and the dark brown pupils of the eyes were only just beginning to colour grey on the outer rim.”

¹ According to my experience, a few adult males commence the winter moult long before this. I have seen some in full winter dress on October 10th.



Walter L. Collins, Sc.

Courtship of the Ferruginous and Tufted Ducks.

The windpipe of the male Ferruginous Duck is narrow both at the top and bottom, but widens half-way down into an oval cavity. At the top of the lower part of the throat is the drum, of which the left side is the longest, and on this there is a large aperture in the skin which is divided in the centre by a branching arch of bone (broad at the top and thin at the base). The right side of the chamber is only divided by small apertures in the skin.

DISTRIBUTION.—The general range of this species is principally centred in the temperate lands of the Western Palæarctic region. It is found breeding throughout Central Asia, but is also very common in Central and Southern Europe. In summer it ranges as far north as Denmark and Central Russia, and in winter west to the Canaries, east to India, where it is very abundant, and south to North Africa. To England it is a regular visitor, chiefly to the eastern counties in spring.

BREEDING RANGE.

Europe: Spain.—A regular breeder in the marshes of the Guadalquivir (Saunders, Lilford, Irby, Chapman, &c.). Chapman (*Unexplored Spain*, p. 190) states that it is said to breed in the Lagunas de Daimiel in Central Spain.

Italy.—It chiefly occurs in spring and autumn passage, but is said to breed in Tuscany, Mantova, and the basin of the Po (Arrigoni). Salvadori says it does not breed in Italy, but his observations were taken many years ago.

Holland.—Probably breeds in small numbers (F. C. R. Jourdain). East Friesland (Dresser, p. 582).

France.—Has once bred near Dunkerque (M. de Meezemaker in Dresser's *Birds of Europe*, p. 583).

Germany.—Breeds in East Prussia (*Ibis*, 1892, p. 579); also in West Prussia, Pomerania, Brunswick, Anhalt, Altenberg, Brandenburg, Posen, Lausitz, and Lothringen. Boje and Mecklenburg state that it used to breed in Holstein (Dresser, p. 582), but apparently it does not do so now.

Austria-Hungary.—Breeds commonly in Hungary (von Madaraz); also in Galicia, Slavonia, and Austrian-Poland.

Balkan Peninsula.—Probably in Greece (Reiser, *Ornis Bale.*, iii. p. 503); commonest breeding diving duck on the Lower Danube and Dobrudscha (Reiser, Jourdain, &c.); Herzegovina (Reiser and Von Kadich); Albania (Lilford); Montenegro, commonly on the Scutari Lake (Lv. Fükver, *Orn. Jahab.*, xii. p. 77).

Russia.—"Commonly N. to Poland, not in Baltic Provinces or Moscow Government; near Tjumen in the south part of the Perm Government, though farther east the range does not extend so far north, but is very difficult to trace" (S. Buturlin, quoted by Dresser).

Asia.—E. Turkestan (*Stray Feathers*, iv. p. 202; Kashmir, abundant (G. Dalglish, Hume, and Oates, *Ibis*, 1909, p. 283, and 1908, p. 42, Stuart Baker, &c.). Hume premises that it may breed on the lakes in the plains of India, but Stuart Baker (p. 231) thinks it does not do so. S. Tibet (Walton, *Ibis*, 1906, p. 255); Ferghana and the Pamirs (*Ibis*, 1883, p. 77); S. and E. Thian Shan region (*J. F. O.*, 1908, p. 81, and 1906, p. 427; commonly in Transcaspia (Jourdain). Finsch found them breeding in the valley of the Ob, Siberia, as far north as the Polar Circle.

Africa.—Morocco (Irby, p. 227); Algeria (Salvin, Locke, Whitaker); probably breeds in Tunisia (Whitaker, *Birds of Tunisia*, ii. p. 215).

MIGRATION RANGE.

Europe.—In winter the range of the Ferruginous Duck extends throughout Central and Southern Europe, where it remains unless driven south by the formation of ice. It is common in Holland and Belgium on migration, and goes north as far as Denmark and North Russia. It is said to have even occurred in Iceland (Hantzsch, p. 186; see also Faber, quoted by Naumann). To Great Britain it is a more or less regular visitor, especially to the eastern counties of England. Howard Saunders records over twenty in Norfolk, but this by no means represents the number that have been taken in that county. A few have occurred in Suffolk, Cambridgeshire, Yorks, and Notts, and one in Northumberland and Lancashire. It has also been taken in Dorset, Devon, and Cornwall (Truro Museum), and has once been observed in Radnor. Other notices of its capture are given from Yorks, Norfolk, Suffolk, Surrey, Cornwall, and Montgomery (*British Birds*, vol. ii. p. 57), and more recent captures in Sussex and Brecon are added in the same publication (vol. ii. p. 377). In Scotland it is rare, having occurred twice in the Tay area and once or twice in the Forth district (W. Evans). The bird has been recorded on seven occasions in Ireland—once from Dublin, once in Antrim, March 1871; twice in Westmeath, January 21, 1893, January 18, 1897; twice from the East Coast, 1879; and once from the North of Ireland, November 27, 1897 (Ussher). Hardly a winter passes without some of these ducks being exposed for sale in the London markets, and certainly some of these are killed in the eastern counties; in fact the bird may be considered of such regular occurrence here that its appearance is regarded as too common to be recorded.

In winter the Ferruginous Duck occurs in S. Sardinia (*Ibis*, 1893, p. 344; see also Bononi's list).

Asia.—A regular visitor to Asia Minor (*J. F. O.*, 1908, p. 621), whilst in Palestine it is one of the commonest ducks (H. B. Tristram, *Ibis*, 1868, p. 328). Occurs in Cyprus (J. K. Bucknill, *Ibis*, 1910, p. 402), Persia (Blanford, p. 302), Quetta (*Ibis*, 1909, p. 283), S. Caspian and Turkestan (*J. F. O.*, 1910, p. 72; Blanford, p. 302), Afghanistan (*Ibis*, 1882, p. 125). In India it is extremely common in winter over the whole of the northern portion (Stuart Baker, *Indian Ducks*, p. 228), but less so in the east of longitude 9°. Farther south it is much rarer. It occurs on passage in Nepal (*Stray Feathers*, viii. p. 363). Stuart Baker states that it is found in considerable numbers in Assam, Manipur, Cachar, Sylhet, Chittagong, and Southern Burmah; but Oates (*Birds of Burma*, p. 288) regards it as rare in the last-named country.

Seeböhm and Salvadori say that it ranges east to the Ob valley, but at present its limits in Southern Siberia are little known.

It is said to have occurred in the West Indies (Jamaica).

Africa.—Some birds winter from Morocco to Tunisia as well as breed there (Whitaker, *Birds of Tunisia*), though Col. Irby (*Ibis*, 1898, p. 609; *Birds of the Str. of Gib.*, 2nd ed. p. 227) states that they leave S. Morocco in winter for the south. It is possible they move south as far as Lake Chad. A few certainly remain in Algeria throughout the winter, for I have seen specimens in the market at Oran. It occurs in the Canaries (Bolle, *J. F. O.*, 1857, p. 348). Common in winter throughout Egypt (Shelley, &c.), and goes north to Nubia (Von Henglin, *O. N.-O. Afric.*, p. 344).

HABITS.—Standing, open expanses of fresh water of much the same character as

inhabited by the Common Pochard is the true home of this neat little duck. They are distinctly freshwater birds that love quiet pools overgrown with sedge and reeds, and do not seem to stay long on lakes where the banks are bare or the bottoms are not muddy and full of vegetation. Lakes with abundant submerged growth, with occasional open expanses of deeper water, are much to their taste, especially those with small green islands and quiet bays. Like all southern species, they dislike cold and rough winds, and in Germany and Hungary they resort much to deep ditches connecting areas of water. Nevertheless they do not like ponds which are too heavily overgrown, but rather those which have sheltered open spaces to which they can retreat if disturbed. They will frequent estuaries of brackish water, but have no liking for the sea, although they may be noticed there on rare occasions. By nature the Ferruginous Duck is not shy, and frequents pools in the immediate neighbourhood of villages. In Hungary they may frequently be seen on small lakes round whose sides the peasants are working.

"They appear," says Naumann, "in our part of the world (Germany) about the end of March in small companies of from 5 to 8, and then immediately betake themselves to the breeding places. In September they are already beginning to appear again in small family parties, and in October they assemble on the larger stretches of water in rather bigger flocks, in order, at the end of this month, or (in good weather) at the beginning of November, to forsake our country and exchange it for a milder climate. They seldom wait for frost and snow, and even in mild winters we ourselves have never seen one which has remained behind: but it is said that they have been come upon, spending the winter at open places on the lakes of Bavaria and Austria, and on some in Switzerland, and this is a certified fact of (lakes) of S. Hungary and the 'Plattensee.' They fly almost always in irregular flocks, and make their extended journeys at night, and in this particular resemble the species nearest akin to them."

Mr. Stuart Baker (*Indian Ducks*, p. 229) gives testimony to the fact that the Ferruginous Duck is generally found on sheets of water similar to those frequented by the Common Pochard, but shows that on migration they may be found almost anywhere:—

"The kind of water," he says, "preferred by the Pochard is also that which forms the favourite resort of the White-eyed Pochard. I have, however, found them in all and any sort of water. Wandering up and down the hill streams, clear deep pools and rushing torrents of shallow water following one another in rapid succession, I have often disturbed small flocks of the White-Eye; and I have equally often found a pair or a small flock in the very dirtiest and smallest pools of stagnant water. It is also found in sea-water, *vide* Sinclair, who says that it is 'the sea-duck of the Alibag Coast,' where they 'ride generally just outside the surf, where they were safe from disturbance from passing boats.'

"Where there were wide stretches of water, clear here and there in patches, but for the most part covered with water-plants, and with shores thickly lined with reeds, &c., White-Eye assembles in vast numbers, but not in very large flocks. These (the flocks) may number anything between half a dozen and over fifty, and even of the latter number there will be but few. Then, again, the birds lie so scattered and far apart that they keep rising in ones and twos, giving the impression that they are only consorting in pairs or very small flocks, and of course many single birds and pairs are really met with."

This bears out the fact that Ferruginous Ducks seldom, if ever, mass in large numbers, as other species do, and even when very abundant, as they are in India in winter and Kashmir in the spring, there is always the tendency of large flocks to break up into small parties or even pairs. My brother, Mr. Geoffrey Millais, who has resided for ten years in Kashmir, and has witnessed extraordinary flights of these birds both before and after the breeding season there, says that this habit of splitting up is the reason why such great bags of these ducks

can be made, for the birds come to the guns, when driven, in a succession of small parties lasting sometimes for hours at a time. All who have seen this bird in its home state that it is a very tame species, lingering in the reeds and vegetation after other ducks have left and many shots have been fired. Mr. Stuart Baker states (p. 229) that "it gets off the water badly, fluttering about and rising very obliquely; nor does it rise high when well on the wing, but generally flies within a few yards of the surface of the water, getting on considerable pace when once fairly away." Captain Shelley states that he has seen flocks of many thousands of these ducks on the lakes of Lower Egypt, where the birds rose with a running flight when disturbed, striking the water very rapidly with their feet, and making a noise in so doing which could be heard at a distance of two miles. All of which is very true, *if there is no wind*. But the few occasions on which I have seen Ferruginous Ducks in flight have shown that if there is a slight head-wind no diving duck rises with greater ease or gets under weigh more easily or rapidly. As Mr. Bates points out, however, the flight is performed at a low elevation, and is rapid and scurrying and accompanied by a slight rustling sound, all forward movements being performed with much swinging of the body, and dips landward to take advantage of every elevation on the land which breaks the wind. Of all diving ducks they seem the most disinclined to leave any sheet of water from which they have been disturbed, and will swing round and round even a small pond before departing, thus giving the gunner many chances to encompass their destruction. But except for the sake of collecting a few specimens, it is agreed by gourmands that no diving duck is less fit for the table than the Ferruginous Duck. I have tried to eat them twice, and confess that the flesh was as rank and unpalatable as others have found it. This is somewhat strange, since the birds feed mostly on a vegetable diet akin to that devoured by Common Pochards, which are admitted to be amongst the best of table birds. To this there is the exception of Col. Irby's testimony, who maintains that birds killed in Southern Spain were far superior to eat than either the Common or the Red-crested Pochards. But tastes always differ, and in this respect a duck which is good to eat in one place might be quite unfit for human food in another. For instance, the *Zostera*-fed Wigeon of the Moray Firth are of the highest culinary importance, whilst no man, however hungry, can eat a Wigeon fed on the cockles of the Dornoch Firth only a few miles away.

It is when ducks live on molluscæ and fish that they are usually unpalatable. Thus in India, where few sportsmen relish this duck, they feed on small fish, caddis grubs, and dragon-fly larvæ to a large extent in the hill streams, whilst in Kashmir, where they are said to be good to eat, the diet of the Ferruginous Duck on the Willah and other lakes is mostly vegetarian. Naumann gives their habitat to be amongst plants of the classes *Myriophyllum*, *Ceratophyllum*, *Chara*, *Potamogeton*, *Stratiotes aloides*, *Hypochaeris morsus ranæ*, *Trapa natans*, *Polygonum amphibium*, *Holtonia*, *Selvaila*, *Lemna*, and various *Nymphææ*, and doubtless they eat the young shoots of many of these.

Their food consists of root-tubers, young shoots, buds and seeds of various water-plants, such as grow under water or float on the surface, but, like other freshwater diving ducks, they capture quantities of water-insects, small fish, frogs, tadpoles, fish spawn, and water-snails. To the last-named they are very partial, and, in keeping these and other ducks in confinement, it is well to obtain a good stock by wiring-off colonies so that they may breed in large numbers without molestation for the first year at least. Naumann states

that they are very partial to the hard seeds of the *Potamogeton*, which they swallow with quantities of fine sand and small stones to assist digestion.

Ferruginous Ducks obtain most of their food by diving in waters of moderate depth, and like to keep near the banks in such places as are not too thickly overgrown with reeds, &c. They search the bottom amongst the mud and stones after the manner of other diving ducks, but do not remain so long beneath the surface as the Common Pochard. They also spend much of their time paddling near the edge of a pond and tilting-up to reach their food after the manner of other ducks. On such occasions the food is often snapped off and brought to the surface to be devoured. They will take quantities of grass seeds, *Carex*, or even grass if found floating on the surface, and for this reason they are very easy to keep in confinement.

Jackel (*Birds of Bavaria*, p. 338) found in the stomachs of shot birds—worms, the larvæ of *Libellula* and *Phryganides*, beetles, cut grass, *Polygonum*, *Potamogeton*, and the remains of *Nymphaea alba*. Like other ducks, they spend most of the warm hours of the day in nesting and preening, and will go ashore to do so and to sleep, retiring to some small green island or bank hidden in vegetation. In this respect they are more retiring in their habits than other diving ducks, although many do not leave the open water at midday, but rest on its surface to sleep. Towards the evening they become active and commence feeding, which is continued throughout the night and early morning. In flight the Ferruginous Duck is easily distinguished from other ducks except the female Tufted, but the bright white secondaries are always more conspicuous, and at close range the form of the bill and head are also quite different. When swimming they sit low on the water with the head well sunk, and their colour makes them easy to identify. The tail trails on the water and the whole bird has the appearance of being much smaller than it really is. The walk is waddling and laboured, and the bird is not much addicted to going ashore. They are expert divers, but do not remain long under water owing to the fact that their food is generally procured at a lesser depth than that of the other members of this group. They dive frequently at short intervals or approach shallows and tip up or merely reach below the water with the neck outstretched.

Naumann's description of their tameness or timidity is a very correct one:—

“They are less cautious than many other species, but on large pieces of water, where they can easily avoid danger, they are timid, though less so than some, a fact which is especially noticeable if you come upon them when they are not in company with other kinds and so are not incited by them to a speedier escape. In this way they make the black coot, which are so fond of forcing their company upon them, much more cautious by their mistrusting behaviour. If they come in smaller numbers or only solitary specimens appear on the smaller ponds, particularly if it is at an unwonted haunt, they might really be called stupid, for they are often, even when there is a good deal of going to and fro of passers by, so incautious that they will only avoid a person if he comes too near—*i.e.* within about 30 paces, and even permit a solitary person approaching them with care to come still closer, or, if they do fly away, they come down again very close by. The female on the nest or with the young behaves still more fearlessly, whereas the adult males behave much more cautiously under such circumstances, but are often enough to be found there by anyone with a gun.

“Their sociableness is not great and more confined to their own species, so that even isolated specimens will not easily join with other species, and this is done still less by small companies of the *fulig. nyroca*, such as we observed in our district at the time of migration, when they always keep aloof from flocks of other species, and this is still more the case in places where, as I saw them in the regions of the Banat in Hungary, they are collected in flocks of 50 or more.”

Except during the breeding season the cry of the male is a hoarse grating sound like the words "korr-korr-korr" several times repeated, and uttered when the bird is alarmed or excited. It is often used as the duck rises or alights. The call of the female is in a higher key, with the syllables "kra-kra-kra," with the last note sometimes long-drawn out. The males, especially in the breeding season, utter a low wheezing groan which can only be heard at close range. I have heard them use this note both in the autumn and winter but not often. The sound is like that emitted by the male Common Pochard but not nearly so loud.

The young make a gentle peeping cry, which they utter until they can fly.

Ferruginous Ducks arrive at their breeding grounds in small parties about the first week in April and at once commence courtship. Like other diving ducks, several males will court one female who, by her actions, has shown a desire to pair. The actions of the male are as follows: The male swims quickly round and about the female or straight towards her with his head held up very high and bill tilted up to an angle of about 75°. At the same time he utters incessantly his spring note, a faint chatter somewhat resembling that uttered by the Mallard Drake, but much fainter. When close to the female he frequently throws the head up and back very quickly, but not nearly so far as the Common Pochard, so that the back of his head never quite touches the back or scapulars; in this movement the bill is perpendicular. The other part of the show is when he swims quickly towards the duck with neck stretched out along the water, the neck itself being puffed out with air and having the appearance of being greatly swollen. During the latter movement the males constantly utter their wheezy groaning note, but the females during courtship, unlike the female Common Pochards, are remarkably silent, and I have never heard one utter a note, a fact which is confirmed by both Mr. Wormald and Mr. Gerald Legge.¹

Writing on March 3, 1912, Mr. Gerald Legge says:—

"I have recently carefully observed the courtship of the female Ferruginous Duck. The throw-back of the head is very quick, but I am sure that, although the head goes far back, the bill is never more than perpendicular. The drakes swim slowly round the duck, keeping up a very low chatter, very like, but very much gentler than, the ordinary chatter of the Mallard Drake. Every now and then a male straightens out his head and neck along the water, and then sometimes raises it suddenly to its full extent, and makes that curious wheezing cry, which is very like that of the Common Pochard, but perhaps not so loud. I can never be sure whether it is Common Pochard or White-Eye making the call unless I actually see the bird do so. The male does not always straighten up after flattening himself on the water, but when he does he always makes the 'wheeze.' He also raised his head and neck slightly two or three times in quick succession, at the same time swelling out his neck and 'wheezing.' The throw-back of the head takes place frequently, and is by far the most noticeable part of the display.

"An old drake and a young drake (9 months old) are now both courting a young duck, but I have never seen the young male throw back the head. He straightens up his head and neck more often than the old male, and this seems to be the whole of his somewhat incomplete show."

When the old male lays out his head and neck along the water, the pupil of the eye contracts so that the white of the irides is very brilliant. This is the case with nearly all drakes in full show. During courtship the male often sits high on the water, and may be seen moving about with the tail much elevated, the white splash of the under tail-coverts being most conspicuous on either side.

¹ I am indebted to both these observers for very complete notes on the courtship of the Ferruginous Duck.

For breeding, the Ferruginous Ducks seem to select somewhat small sheets of stagnant water with muddy bottoms, and well furnished with sedge and water plants such as *Stratiotes*, *Nymphaea*, *Trapa*, &c.

Naumann states that they arrive at their breeding places in Germany in small companies at the end of March, there being more males than females.

"It is seldom before the end of April," he says, "that their behaviour becomes more excited, whilst, divided into separate parties, the males begin to solicit the favour of the females and swim after them continually. As generally one female is the choice of several of the males, the latter soon come to blows with one another, and such fierce fights arise between them that often in their squabbles amongst each other they peck at and skirmish about to such an extent that they are blind and deaf to their surroundings, and would disregard all danger if the watchful females, calmly looking on at the fight, did not attract the attention of the combatants to the threatened danger by a gentle cry of warning. But if the danger passes without having further consequences, the fight generally begins again immediately; the ponds therefore on which they breed are extraordinarily animated, for amongst the various species which breed in our land no others are so quarrelsome and make so much noise, uttering at this time their rattling, loud cry all the time. The female often has to seek refuge from the crowd of pursuing suitors in the thickest clumps of reeds; but once the choice is made, she slips away with her chosen mate from the place, and both then remain far from the scolding company of the others, seeking out retired, lonely spots amongst thick undergrowth, where they will be little noticed by the others, under overhanging banks, and other hiding places, whilst the rest keep to the middle of the open water until all are mated. Thus finally only the odd ones remain, which, not infrequently, then disturb the mated pairs, but as a rule soon go altogether away. The birds are now always seen in pairs, the female always flying on in front, and soon their frequent presence at some particular spot shows the nesting-place they have selected.

"Their nests are always found in rather hidden-away places, now on a small mound of sedge, or of a so-called 'Kufe' (tub), now at the edge of a small island, or of an overhanging bank, hidden between sedge and growths of willow, now at the edges of the dykes which generally run beside the ditches at regular intervals through the middle of carefully-managed fish-ponds, and sometimes at the side, in some chance hollow of the ground, or also on a little mound of earth, and even at some little open place among a thick growth of reeds, but never very deep in these. The nest is everywhere placed so that the female can get to it immediately, at any rate on one side, after swimming, or only needs to walk a few steps to do so. It is never very far from the water and in the more swampy patches of sedge; the nest is placed wherever there is most water. In places where the nest does not rest altogether on the ground the stalks and leaves of plants which grow under water, and are to form the foundation of the structure, are bent down and trodden under into the size the nest is intended to be, and it is always in the middle of such a clump, so that the surrounding sedge, reeds, &c., which are not bent down should serve to hide it, as often the ends of these plants cross over it and form a sort of roof of foliage. Many are made so that they can only be reached from one side, and that always the water side. In the building the male is certainly in the vicinity, but has not been seen to take an active part in it. The female gets the materials for building from the surrounding growth—from dry stalks of grass, leaves of sedge and reeds, dry sticks of grasses, meadow grass, and occasionally a certain amount of moss; all these different materials are carelessly woven together—first the coarsest ones; the finer are kept for the inside, and all formed into a wide, deep basin.

"The mated pair remain inseparable during the time of laying, and when the female is on the nest the male is not far off, so that he can warn her of any approaching danger immediately, so that at the right moment she can creep away and get off unseen, or, at the worst, fly away altogether. When therefore a solitary male is found, at the end of May, often at the same place, the nest is generally to be found quite close by. At about this time a complete sitting may be found in a nest, and this, as a rule, consists of nine to ten eggs, less often of twelve."

If the first nest is destroyed, like most of the other species the Ferruginous Duck will lay a second sitting of not more than five eggs, but if she has sat on her first nest for some

time, and the eggs are taken or destroyed, she will not lay again. The nesting habits, too, are very similar to those of other diving ducks. The male attends closely to the female until the young are hatched, and then leaves her to join other males. Once the female begins to sit she leaves the nest as little as possible, and, if constantly disturbed, will leave a place and construct a new one in a more hidden spot. At the beginning of June she begins to sit. She covers the eggs with down plucked from her breast, and this is increased every day till it forms a close pile surrounding the top and sides. Naumann gives the period of incubation at from twenty-two to twenty-three days, but Mr. A. E. Blaauw, who has bred the species in confinement, states in a letter to me that it is twenty-seven to twenty-eight days. The probability is that, like the Tufted Duck, it varies from twenty-four to twenty-eight days.

In Kashmir the first birds breed in the end of April, but not many until the beginning of June (Stuart Baker). Mr. Heatley Noble found numbers of nests in Hungary, south of Buda Pesth, in company with the nests of Gadwall, Pochard, and Mallard. "The nests," he says, "were always placed near water, and often on an island. Full clutches are laid by June 6th; number of eggs, 8 to 12." Stuart Baker gives the usual number as 6 to 10 in Kashmir, but says that in Europe they sometimes lay 12, and that he has known one instance, in Turkey, of 14 (p. 232).

The early stages of the young and their life are very similar to other young diving ducks reared on freshwater lakes. As soon as they are dry they leave the nest and enter the water, where they feed on small insects, larvæ, seeds, and the tender shoots of young water-plants, which are in many cases broken up for them by the mother. The young soon become the most expert divers, and can pass out of sight and hide as quickly as any duck if threatened with danger. In a fortnight some feathers are assumed, and pinion feathers in about two months. As soon as they are able to fly, and the old female has also moulted, the latter takes her brood away to larger sheets of water in the neighbourhood, and the migration commences about the middle of September. At this season young and old of both sexes join together, and move gradually to their regular winter resorts.

During the breeding season the young birds are subject to constant molestation from various species of Harriers, whilst crows, magpies, and rats destroy a certain amount of eggs, whilst a wandering fox will often take an old bird off her eggs. Parasitic insects (*Trinotum luridum*, and *Decophorus icterodes*) infest the feathers, and in the intestines are found many of the same parasitic worms as infest the Common Pochard, such as *Echinorhynchus filicollis*, *Distomum echinatum*, and *Taenia lanceolata*, &c. All sportsmen who have killed large numbers of these ducks in Southern Europe, Kashmir, and Northern India, state that when thus found in small lakes it is a very easy duck to shoot, but tough to kill. Even on large lakes their habits of rising in detached parties and flying at a low elevation render them easy of capture by an experienced shot, and thus account for the enormous bags made in Kashmir and India.

The Ferruginous Duck is a species that is easy to keep in good health in confinement,¹ and if proper attention is paid to food and surroundings it will nest with freedom. Mr. H. St. Quintin, Mr. Hugh Wormald, and other aviculturists have bred this duck almost

¹ Mr. J. H. Gurney has known a drake live in captivity for fifteen years (H. Saunders).

annually, and have found that the young birds of the previous year will breed in the first spring, but not as freely as birds of two years and over. Mr. F. E. Blaauw, who has been successful in breeding many rare water-fowl in Holland, kindly sends me the following note:—

“The White-eyed Pochard is a very free breeder in confinement, and the chicks are easy to rear. The duck makes her nest, either in a box which is placed on a pole in the water, and which is shaped like a small dog-kennel, or in the sedge along the water's edge. The eggs are from 7 to 11 in number, and are dark-buff or pale coffee-brown in colour. Incubation lasts from 27 to 28 days as a rule. As soon as the young birds are full-grown and able to fly the irides of the young males begin to turn lighter in colour, so that even before the autumn it is quite easy to distinguish the sexes with certainty. At one year it is scarcely possible to distinguish young from old males. The only difference between young and old females at one year is that the young are lighter in colour, whilst the young male is not so brilliant as the old one.”

The ducklings are easily reared on ants' eggs, bread crumbs, and duckweed.

In confinement, numerous hybrids between this species and the Tufted Duck have been reared. It has also bred with the Common and the Red-crested Pochard. “This species,” says Mr. Blaauw (*Ornamental Waterfowl*, p. 208), “readily produces hybrids with the Red-headed Pochards, and if a hybrid of this union is again mated with a White-eyed Duck, the offspring is scarcely to be distinguished from pure *Nyroca leucoptalma*.”

BAER'S POCHARD

Nyroca baeri (Radde)

Anas (fuligula) baeri, Radde; *Reise S. O. Sibir*, ii. p. 376, pl. xv., (1863); *Nyroca baeri*, Radde; Salvadori, *Cat B. M.*, xxvii. p. 344; Blanford, *Fauna B. I.*, p. 461; Oates, *Game Birds*, ii. p. 328; Stuart Baker, *Indian Ducks*, p. 223.
Fuligula baeri, Finn; *P. A. S. B.*, 1896, p. 61; id. *Journ. A. S. B.*, lxvi., pt. 2, p. 525; id. *Indian Ducks*, Asian, 1899.

LOCAL NAME.—Eastern White-Eye (*English*).

Egg.—Only a very few examples of the egg of this species are known, and even these are not well authenticated. Three described by Goebel average in size 54×39 mm. Max. 55×39 , min. 53×39 (2.12×1.53 in.). Stuart Baker has a single egg measuring 2.01×1.51 in. (51×38.3 mm.), which he describes as slightly larger than the Ferruginous Duck; colour, a dirty dull-coloured drab; shape, a broad regular ellipse; the gloss and texture similar to Ferruginous Duck eggs. Nehrkorn describes the egg as 51×38 mm. in size. Of the young in down I have seen no specimens.

Immature Male.—Mr. Stuart Baker says (p. 224): "A young male in my possession has the whole head mottled brown and black, the new black feathers showing the sheen of the usual green gloss; the breast is a queer mixture of dirty yellowish-brown and the deep rufous or bay of the adult bird; the lower abdomen and vent are mixed brown and white.

"Another young male exactly answers to the description above given for the female, but that the definition between head and abdomen is very sharp, and the olive gloss on the wing is highly developed."

Baer's Pochard is easily recognised from the Ferruginous Duck by its larger bill and darker head and neck and upper parts. The passage of plumage is doubtless exactly similar to that species and the Common Pochard.

Adult Male.—"A large spot at the angle of the chin, pure white; the remainder of the head and neck black, glossed with green; breast, rufous-chestnut, that colour merging into the black of the head, but sharply defined the white of the abdomen and under tail-coverts; the feathers of the vent brownish at the base; flanks, rufous-brown; upper parts, dark brown; the scapulars and inter-scapulars very finely covered with narrow bars of lighter brown; rump and upper tail-coverts, brown; the back, a few of the feathers at the side finely vermiculated with white; tail, brown; wing-coverts, dark brown; the outer secondaries, white, with a broad sub-terminal black band; quills, brown; the inner webs of the primaries, greyish-brown; the inner secondaries, very dark brown; in good specimens very narrowly-margined black on nearly the whole of the outer web, and glossed with olive-green.

"Bill, dull slate-blue; the basal third tip and nail, black; irides, white; legs and feet, greyish-lead; joints and webs darker.

"Length, 18 to 20 inches; wing, 8.2 to 9.5; bill from point to forehead, 1.75, from extreme base, 2.2, from gape, 2.1; breadth at base, .73, and at broadest part .86; tarsus 1.4."—Stuart Baker (p. 223).

Adult Female.—"Like to male, but the head is blackish-brown unglossed with green, and has the anterior part rufous; the spot on the chin appears to be smaller, and the breast and lower part of the neck are more rufescent and paler; the whole tone of the bird is duller, and the definition between the breast and abdomen is blurred and indistinct, while the abdomen itself appears to be a sullied, not pure, white.

"Irides grey or brown, perhaps white in very old females;¹ bill and feet as in the male, but still duller.

"Length about 16 inches, being about 7.5; tail, 2.3; bill from point of forehead, 1.7, from extreme base, 1.98, from gape 1.9, in breadth .61, and at the widest part, .85; tarsus about 1.4."—Stuart Baker (p. 223).

Mr. Finn states that the females vary in size more than the males, and some are much duller and less like to males than others, a comparison we often notice in the Tufted Duck, sometimes due to age.

BREEDING RANGE.—The breeding range of this species is centered in North-Eastern Asia. Seebohm gives it as the Amur Valley, Dresser (*Eggs of European Birds*, p. 571) mentions Kamtschatka, Ussuriland, Central Amur, and the Argun River as its common home. In the Argun River Valley (a tributary of the Amur) Dybowski obtained specimens in spring (*J. F. O.*, 1874, p. 337).

It certainly occurs in Kamtschatka (Stejneger, *Pr. U.S. Nat. Mus.*, x. p. 137), Manchuria, Ussuria, Argun River, and probably in Ochotsk, where Mr. J. Scott saw ducks answering its description in 1911. It probably breeds throughout this region, although nothing definite is known regarding its breeding habits or eggs.

MIGRATION RANGE: Asia.—It occurs in Manchuria (*Ibis*, 1909, p. 461); China, found on the Yangtse (*P. Z. S.*, 1871, p. 419; *Cat. B. Br. Mus.*, xxvii. p. 344); *Ibis*, 1891, pp. 328–497; has been taken at Shanghai (*Cat. B. Br. Mus.*), and been known as a regular visitor to China (David, *Dis. Chine.*, p. 507); Ussuriland (*J. F. O.*, 1874, p. 337; 1875, p. 257; Japan (Seebohm, *B. Jap. Emp.*, p. 254; see also *Ibis*, 1874, p. 22, &c.; 1878, p. 215); India, a regular and not uncommon visitor to the north-eastern provinces of India and Western Burmah (Stuart Baker, *Indian Ducks*, p. 274); considered by Oates to be common in Cachar, Sylhet, Manipur, and Burmah, but Baker says that though it may occur in the three first-named it is not common. Harington (*B. of Burmah*) says that it is a regular cold-weather visitor to Mandalay, and records it from Bhamo and Chindwin.

The only example taken in the British Islands, or, in fact, in Europe, is one shot on the Tring Reservoirs on the 5th of November 1901. The specimen, a male, was exhibited by the Hon. N. C. Rothschild, at the meeting of the B.O.C., November 20, 1901, who urged in support of its claim as a British bird that no specimen had escaped from the Zoological Gardens, where four examples existed at this date, and which at the time were the only known ones in confinement in this country. At that time I knew of no other specimens, but her Grace the Duchess of Bedford has since informed me that there were examples of Baer's Pochard on the lake in front of the Abbey at Woburn at this date, and she *believed* it

¹ This is correct; one of the females in confinement in the Zoo, 1901, had white irides.—J. G. M.

possible that they had bred there. If this is the case, Baer's Pochard cannot stand as a British bird, but as there seems to be no certainty of this, as suggested by the Duchess of Bedford, I can merely give the supposition as a suggestion. Mr. Howard Saunders (*B. Birds*, vol. i. p. 14) deprecates the inclusion of this bird, to which the Hon. Walter Rothschild replied (*B. Birds*, vol. i. p. 63) that since the four specimens in the Zoological Gardens were the only known examples in Europe, and had never bred, the specimen shot at Tring should be regarded as a wild one. Moreover, he thinks this the most probable, as a strong easterly gale was blowing for a week before its capture.

Under any circumstances we can only accept Baer's Pochard as a doubtful British bird, for it must remain under a certain suspicion, like the Baikal Teal and the Ring-necked Duck, whose winter range is far from British waters.

HABITS.—At present we have little information of this bird in its wild state, but when more is known its life will doubtless prove to be very similar to that of the Ferruginous Duck, to which it is so closely allied. Mr. Finn says they rise more easily on the wing and fly with less effort than other Pochards, and that the birds in confinement at Alipore seem to stand the heat less well than the Ferruginous Duck, probably owing to the fact that it is a bird of higher latitudes.

In April 1902 I had the good fortune to witness the courtship of Baer's Pochard at the Zoological Gardens, London, on two occasions. The attitudes of the males were in every way similar to the Ferruginous Drakes. They laid themselves flat on the water and blew out the neck with air. In this moment of excitement the black pupils almost disappeared in the straw-coloured irides. Another attitude, also assumed by the Ferruginous Drake, was to throw up and back the head and neck, and also stretch the neck to its fullest extent, with head held horizontally, and blow it out with air. On neither occasion did I see a male throw the head right back until it touched the shoulders, as the Common Pochard does.

TUFTED DUCK

Nyroca fuligula (Linnæus)

- Anas fuligula*, Linn., Syst. Nat., x. ed., i. p. 128 (1758). Naumann, &c.
Anas glaucium minus, Briss. Orn., vi. p. 411, pl. xxxvii. fig. 1 (1760).
Anas fuligula, Linn., Syst. Nat., xii. ed., i. p. 207 (1766). Schlegel and others.
Le Morillon, Buff. Hist. Nat. Ois., ix. p. 227, pl. xv. (1783).
Anas cristata, Leach, Syst. Cat. M. and B. Brit. Mus., p. 39 (1816).
Nyroca fuligula (L.) Fleming, Phil. of Zool., ii. p. 260 (1822).
Aythya fuligula (L.) Boie, Isis, 1822, p. 564.
Fuligula cristata (Leach), Steph. in Shaw's Gen. Zool., xii. pt. 2, p. 190 (1824). Saunders, Dresser, and others.
Platypus fuligulus (L.) C. L. Brehm, Lehrb. d. Naturg. Eur. Vög., ii. p. 833 (1824).
Aythya cristata (Leach), C. L. Brehm, Vög. Deutsch., i. p. 916 (1831).
Fuligula fuligula, Licht. Nomencl. Av., p. 102 (1854). Salvadori, Collett, Stuart Baker, &c.
Fulix cristata, Swinhoe, P. Z. S. 1871, p. 419; Hume, Str. Feath., i. p. 265 (1873); Prevalsky, p. 164 (1891).
Nyroca fuligula, Reichenow, Vög. Afrikas (1900); Blanford, Fauna, Brit. India, iv. p. 463.

LOCAL NAMES.—Tufted Diver, Crested Diver, Black Duck, Tufted Scaup, Black Pochard, Least Wigeon (Kent), Black Poker, Tufted Wigeon, Tufted Pochard, Old Hardweather, Black and White Diver, Pied Duker, Lapmark Duck (Pennant) (*English*); Lach an Squmain, Squmalach, (*Gaelic*); Morillon, Jaffre, Jaffre noir, Huppe, Morette, Boni negre (*French*); Reiherente, Haubenente, Schopfente (*German*); Negrinha negretta, negro (*Portuguese*); Canade moninegro, Anade de Cresta, Pelucon, Coquero, Morell, Capellat, Pato (*Spanish*); Moretta, Campanato Stampanato, Canard pegonnie, Moetta do Suffo, Bastardone, Agootinella (female) Muretta, morettone (*Italian*); Kuifeend, Kamduiker (*Dutch*); Braimla (*Maltese*); Cruka Ribolovka (*Montenegrin*); Tschernett, Tscherneely, Retschnewaja, Tschernaja, Chochlatuja, Chochlatisch (*Russian*); Kaczaa-Czernika (*Polish*); Dongus-giri (*Tartar*); Bubos recza (*Hungarian*); Topand (*Norwegian*); Vigg, Viggand, Tofsand, Martigge, Hagerand (*Swedish*); Troland, Vibeand, Topand (*Danish*); Ionhisotka, Vartti, Narsku, Varia, Vikio (*Finnish*); Kinkjroha jiro-gamo (*Japanese*); Suracah (*Arabic*); Krunata, Crna norva (*Bosnian*); Patka Capljarka, Patka Krunata (*Croatian*); Kachna chocolata (*Czech*); Cruinka (*Dalmatian*).

Egg.—Eggs rather coarse in texture, with some gloss; colour yellowish-brown. Sometimes with greenish tinge. Shape frequently a much elongated ellipse or long oval. Average size of 150 eggs, 59.0×40.9 mm. Max. 65.9×46.3 and 63.9×47.2, min. 53×38 (or in inches 2.32×1.61 inch) (F. C. R. J.).

The number of eggs in a clutch usually ranges from 8 or 9 to 10, but at times much larger numbers are found. R. J. Ussher has recorded a nest with 14 from Ireland, and in May 1899 Mr. Malloch of Perth sent me a photo of a nest high up on the old castle at Loch Leven which also contained 14 eggs. The Rev. F. C. R. Jourdain has met with clutches of 11, 12, 15, 16, and 18, but the last seemed certainly to be the produce of two ducks. The late T. E. Buckley found clutches of 16 and 17 in Caithness. Newton in the *Ootheca* mentions 21 eggs as found in one nest, and Jourdain found a duck sitting on a pile of 28 eggs at Osmaston, Derbyshire, which of course she was quite unable to cover, but in this case about five ducks were laying in one nest. Stuart Baker speaks of 40 eggs as found in one nest, but gives no details.

Young in Down.—Dark brown on the upper parts, in some being more rufous than others; crown, eye-stripe, and back of head and neck dark brown, whilst the cheeks above and in front of eye and throat are yellowish-buff turning to white on the chin. The majority of ducklings follow this rule, but many are dark brown all over the head and neck and only greyish-white on the chin. Under parts yellowish-buff or greyish-buff. At a fortnight old the under parts often fade to greyish-white. When first hatched, the irides are stone-grey the same as the Pochard, they become gradually dull-yellow at six weeks old (W. Percy). Feet and legs, slatey-black, with olive-yellow stripe on each side of both and inner leg. Bill, upper mandible, brownish-black with brownish-yellow nail. The nail changes colour in one week and becomes black; lower mandible, yellowish-brown or flesh colour at first, but the under surface soon changes to dark brown.

“Down becomes lighter on flanks at 3 weeks, giving the bird a half-and-half appearance. Olive stripe on feet quite bluish at 3 weeks and almost as blue as adults at 4. At 6 weeks legs practically as blue as adults, but the bills are still leaden black throughout. First feathers appeared on the flanks at the 26th day” (W. Percy).

Immature Male.—In first plumage the young male has the head, neck, upper chest, mantle, scapulars and wing-coverts, and tail a dark brown, the mantle and scapulars being finely vermiculated with light grey. The feathers of the upper chest are edged with brown, turning to white where they join the under parts, which are white. Tail-coverts, blackish-brown; lower belly, vent, thighs, pale brown; under tail-coverts, white. There are always some white feathers on the head just behind the upper mandible, but these vary from a few to a broad band half an inch in breadth. By December these white feathers have mostly disappeared. Primaries dark brown on the outer edge, pale greyish-brown on the inner part. Secondaries, white on upper half, brown on lower; rest of the wing dark brown, finely vermiculated over the centre with light grey. Flanks, pale brown inclined to red. By December there is little change in the plumage except the head, which now shows numerous new feathers of the black, shot with purple, adult plumage. Sometimes a few dark feathers appear on the sides of the mantle and the mantle itself and scapulars are much darker. After December the advance of plumage proceeds rapidly. By the end of January young birds are half changed, and by March 1st the young male is nearly in full dress, except for a few brown feathers on the neck and sides of the breast. The crests of these young males are always short, seldom exceeding 1 inch, and much browner than adult specimens. The new black breast feathers are also more heavily barred with white and the flanks still marbled and grey. In May young males are difficult to tell from the adult except by their shorter crest and duller plumage. They may now be said to be adult, as they will pair and breed, but are much finer in plumage in the second spring, and at their best with long crests in the third year. In the winter the irides of the young male are clear pale yellow and the bill a somewhat dirty ashen blue. The feet are like those of the adult, but have a greenish tinge which passes away in March.

Adult Male.—Head, neck, breast, back, tail, rump, under tail-coverts, wing-coverts, and thighs black; the head and neck have a green-purple sheen on the cheeks and a rich purple gloss on the other parts, including the crest. The crest varies from 1 to 2 inches in length, but in a remarkably fine male, the finest I have ever seen, which I killed in Orkney in January 1885, it is no less than $3\frac{3}{4}$ inches in length. The breast on the lower



Printed by Albert Frisch-Berlin

TUFTED DUCK
adult male and female (breeding plumage)

part is edged with white feathers in winter, but these tips wear off by the end of April. The brown-black mantle and scapulars have fine vermiculations of whitish-grey. Primaries, dark brown, the inner web of the first whitish at the base, fading into brown; the white on each quill increasing in extent until in the innermost only the terminal part is dark brown. Secondaries, dark brown on the lower part, white above. Minor secondaries, dark brown, glossed with green; upper wing, dark brown; lower parts and flanks, pure white; irides, bright golden-yellow; bill, slate-blue with black nail; legs and feet, lead-blue. Length, 17 to 18 inches; wing, 7.6 to 8.5; tarsus, 1.5; bill, 1.52 to 1.75 inch. Weight, 1 lb. 8 oz. to 2 lb.

The adult male commences to pass into eclipse about the 1st of July. This consists of a partial moult of the whole of the head and neck, the greater portion of black feathers being replaced by dull-brown ones. The black breast shield changes on the upper half to new feathers, brownish-black edged with light-brown or grey, the lower ones white, vermiculated with brownish-grey or barred with dark-grey. Individuals vary greatly in the form of this breast change; some retain a number of black feathers boldly edged with white and interspersed with light-brown feathers edged with sandy-brown. Most examples only moult the whole of the back and scapulars once, the old feathers in July fading to a dull brown before being renewed to complete winter plumage in August. Wing, rump, and tail are also renewed direct to winter dress in August. The most noticeable change to eclipse, however, consists in the assumption of grey-brown feathers from the lower breast to the tail-coverts, and also in the advent of a mixture of white feathers vermiculated with grey and fine grey-brown feathers all along the flanks. All these feathers, as well as the breast and head feathers, are again shed in September, and renewed by complete winter plumage. The long crest is only shed once in the eclipse moult, and falls slowly, not being completely lost till early September. The under tail-coverts are most interesting, and are changed in August to white, vermiculated with greyish-black, or black vermiculated and edged with white; these change colour in October to black.

Adult Female.—Head and neck, brown intermixed with black; mantle, scapulars, wing-coverts, upper parts of the wings, rump, and tail, very dark-brown. The upper mantle and hind-neck are very russet, and all the feathers of the upper parts are edged with brown, inclined to sandy-brown at the tips. In some examples the scapulars are very finely vermiculated with greyish-white. In most cases there is a space of white feathers extending from the top of the bill round to the chin. This varies to a greater or less extent in individuals; in some it is nearly half-an-inch broad, in others it is less, and intermixed with brown feathers, whilst in one example, killed at Murthly, in Perthshire, on August 15, 1884, the white is entirely absent. This white face is not necessarily a sign of winter or summer dress, for breeding females have it as well as winter birds. The flanks vary from rich red-brown to light brown edged with light greyish-brown. In winter the lower breast and under parts are pure white, or sparsely intermixed with red-brown feathers. Round the vent and thighs, reddish-brown, passing into black by the back of the vent, and again into white, or brown and white, on the under tail-coverts. Primaries and secondaries similar to the male. In June, by plucking and moulting, the whole of the under parts, from chest downwards, undergo in many instances a somewhat

remarkable change. These parts, in certain individuals, become red-brown all over, edged with sandy-brown, whilst in others a number of the white feathers with brown upper portions are retained. I have killed a number of female Tufted Ducks in August, which were almost without a white feather on the breast, but the proportion of these dark females is about one in six. In September the adult females undergo a complete moult to the winter plumage. Bill of nesting female, black, with lead-blue at the end and sides. The blackish-brown crest on the head of the female is about 1 inch in length, and I have never seen one longer than 1.5 inch. Mr. Stuart Baker, usually very accurate, says that it is sometimes nearly 2 inches, but I think this must be an error.

Length, 15.2 to 17 inches; wing, 7.6 to 8 inches; tarsus, 1.2 to 1.4 inch; bill from gape, 1.8 to 2 inches; "weight, 1 lb. 5 oz. to 1 lb. 12 oz." (Hume).

Immature Female.—In first plumage the young female is similar to the young male, but is always paler in colour. By October it is easily distinguished by the paler head and the difference in colour of the chest feathers, and the absence of the grey vermiculations in the mantle, scapulars, and back. The breast through the winter is white, and does not contain the broad brown feathers of the adult female, but the plumage of the upper parts of the body is the same as the adult female, except that it is paler. The crest is not assumed until the spring, and it is then very short. In fact the whole of the feathers of the upper chest and about the thighs and vent are pale-brown, and light compared to the adult. The patch behind the bill is not white, but pale brownish-grey. A moult to the adult plumage commences in December and proceeds until the end of March, when it is difficult to tell young birds of the previous year from old ones. Maturity may be said to be attained at nine months. At this age they will pair, but as a rule do not breed till the second spring. Only one pair of young Tufteds out of five showed any inclination to nest with Mr. Wormald. In the second spring the Tufted may be said to be fully adult.

In all plumage changes of the Tufted Duck I find myself quite in agreement with Naumann, who summarises the chief moult as follows:—

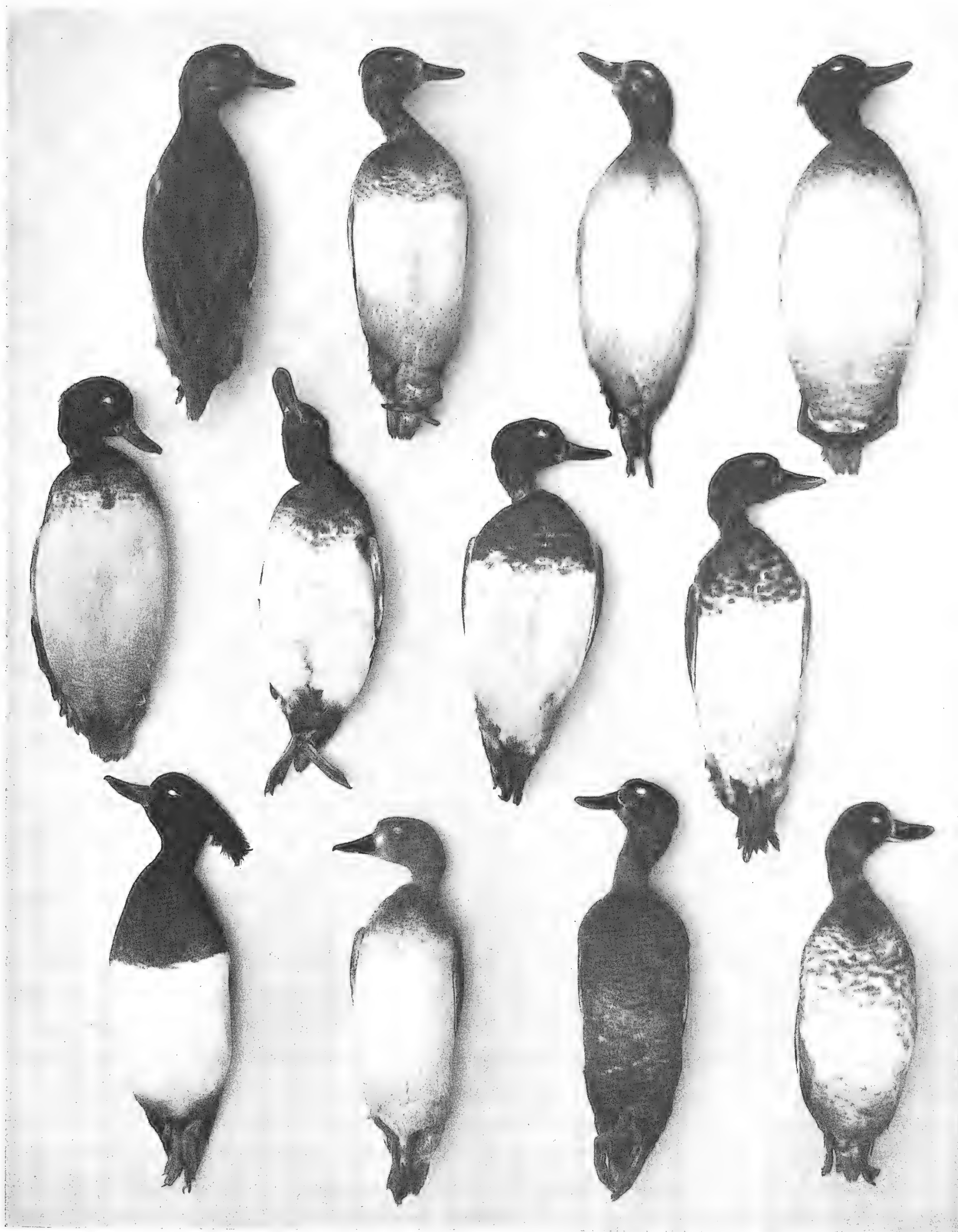
"The chief moulting of the males begins (under the same conditions as others) at the beginning of July, often even before June is over, and is ended by the beginning of August. They generally keep rather together at this time, in remote places where they have the sea quite near, and on it too, especially in the last weeks of this period, when the flight and tail feathers have come out, and until the new ones have grown they cannot fly.

"The females, on the other hand, undergo their moulting much later if the young will soon be fledged, and often appear hunting with them in August, in the same condition. In October, with the adult male there occurs the 'beauty' moulting, in which they exchange the preceding summer plumage for the 'wedding glory' plumage, at which, however, they retain nearly all the wing and tail feathers. In November this exchange is in most cases completed, whereas in the younger males of this year it begins later and continues more slowly, so that on their departure, and in winter, many of these, indeed several of a preceding retarded brood, have not on their return in the spring, even at the beginning of the mating time, yet got their full 'wedding robe' quite completely."

BREEDING RANGE.

British Isles—England: Yorkshire.—The first record of its breeding is mentioned in the *Zoologist*, 1850, p. 2879 (Saunders). Cf. *Birds of Yorkshire*. Now a regular breeder.

Notts.—There are a few early records of breeding in Notts, as indicated in Rowley's



PLUMAGES OF THE TUFTED DUCK.

1. Immature male; first plumage. Loch Leven, N.B. Oct. 7th, 1883. Age, 3 months and 7 days.
2. Immature male. Loch Leven, N.B. Sept. 30th, 1881. Age, 3 months. Early-hatched bird.
3. Immature male. Cambridgeshire. Oct., 1890. Age, 3 months.
4. Immature male. Lock Duddingston, Midlothian. Jan. 3rd, 1887. Age, 6 months and 3 days.
5. Immature male. River Eden, Fife, N.B. Dec. 15th, 1892. Age, 5 months and 15 days.
6. Immature male. Yenikale, Crimea. Mar. 1st, 1887. Age, 8 months. Almost adult; crest short.
7. Adult male; commencing eclipse. Fort George, Nairn, N.B. Aug. 1st, 1891.
8. Adult male; full eclipse. Loch Flemington, Nairn. Sept. 1st, 1890.
9. Adult male; exceptional crest. Loch Stennis, Orkneys. Jan. 30th, 1885.
10. Immature female. Loch Leven. Sept. 2nd, 1883. Age, 2 months and 2 days.
11. Adult female; full breeding plumage. Loch Leven. Aug. 7th, 1882.
12. Adult female; full winter plumage. Loch Leven. Oct. 7th, 1883.

Ornith. Miscellany, vol. iii. p. 229; J. Whitaker, *Notes on Birds of Notts; Zool.*, p. 4440. Now it is plentiful and breeds on every lake of suitable character, notably Newstead, Clumber, Welbeck, Rufford, Rainsworth, and Annesley Park, where I have recently seen it in numbers. Notts seems to have been the distributing centre from which the birds spread throughout the Midland Counties of England. A great increase and distribution took place soon after the passage of the Wild Birds Protection Act in 1886.

Lancashire.—There are only a few records of nests (see H. O. Forbes, *Vict. Hist. Co. of Lancaster*).

Northumberland.—Saunders (*Manual*, p. 441) records it as breeding in this county. Mr. Maurice Portal informs me (June 1, 1912) that several pairs of Tufted are now breeding on the High Loch at Netherwitton Hall, W.N.W. of Morpeth, and have done so for some years. On May 24 five pairs were observed, and later only males were seen, as the females were sitting. On nearly every suitable lake (Chapman, *Bird Life of the Borders*, p. 92). H. B. Tristram (*Vict. Hist. of Durham*) says it does not breed in Durham. Lord William Percy at Alnwick, and Mr. Maurice Portal at Hexham, have reared numbers from the egg.

Norfolk.—Probably bred as early as 1823 (Saunders), and now breeds freely throughout S.W. Norfolk (*Vict. Hist. of Norfolk*).

Sussex.—Borrer records it as breeding at Coulhurst, in Sussex, in 1853. Curiously enough, no Tufted Ducks have been seen on this lake during the last twenty years, but it breeds occasionally at Knepp, Burton Park, and a few other lakes in the county (see also *Vict. Hist. of Sussex*, J. G. Millais). It is a regular visitor at Warnham Pond, but so far has not bred there.

Hants.—First recorded as breeding in 1890. It has increased rapidly, and now breeds in six or seven places. (See Kelsall and Munn, *Birds of Hants*, p. 233); also *Zool.*, 1891, p. 357.

Dorset.—Saunders (p. 447) mentions it as breeding in this county, also Professor Newton. (See also *Field*, March 10, p. 776, and *Birds of Dorset*, p. 158.)

Somerset.—It is considered to breed on Blagdon Reservoir (F. L. Blathwayt, *Zool.*, 1908, p. 114; *British Birds*, vol. iv. p. 366).

Bucks.—It breeds at Wester Turville. (See Hartert and Rothschild, *Vict. Hist. of Co. Bucks*, i. p. 146.)

Derby.—Mr. F. C. R. Jourdain informs me that it breeds regularly in the south-west of the county, especially at Osmaston, and is spreading. (See also *Zool.*, 1899, p. 476; 1900, p. 429, and Jourdain, *Vict. Hist. of Derby*, i. p. 141.)

Stafford.—Since 1880 it has bred at Weston Park (H. G. Forrest, *Zool.*, 1900, p. 506), also on the east side of this county, at Calwick, since 1906 (F. C. R. Jourdain, *British Birds*, ii. p. 83), and regularly at Patshull, as well as occasionally in other localities, Cheadle (1886), Ashton (1879), Willoughbridge (1892), and Four Ashes. (Cf. *Vict. Hist. of Stafford*.)

Salop.—A pair or two have bred at Beaumer, near Condover (1879), and probably do so to-day; breed at Weston, near Whitchurch, and near Shifnal (H. E. Forrest, *Zool.*, 1900, p. 506). I have seen them on the lake at Hawkestone, but the species does not breed there. It breeds regularly at Patshull, on the borders of the county. With regard to the species

at Patshull, Mr. Gerald Legge sends me the following note: "April 4, 1912.—The Tufted are coming in every day now; they are later than last year, when the bulk of them arrived April 1. This year there were only three pairs here on April 1, and now (April 4) there are eleven pairs as against seventeen pairs that bred here last year. The adult drakes left here June 26, 1910, and June 24, 1911."

Cumberland.—First bred in 1888 (*Zool.*, 1888, p. 330).

Devon.—Regular visitor, and possibly breeds occasionally (D'Urban and Mathew, p. 232, and Appendix ix. p. 23).

Essex.—Probably breeds (M. Christy, *Vict. Hist. of Essex*).

Cheshire.—It has bred within the last four years (Coward and Oldham, *Vert. Fauna of Cheshire*, i. p. 339). In November 1910 and 1911 I saw numbers of Tufted Ducks in the Park at Tatton and at the Mere, and was told by the keepers that the species bred there regularly. They also breed in other lakes in the neighbourhood of Knutsford.

Hertfordshire.—Nests regularly. (See *Country Life*, May 14, 1910.)

Surrey.—Mr. J. Bucknill says he could find no record of its nesting (*Birds of Surrey*, p. 239), but Mr. P. F. Bunyard records (*British Birds*, vol. vi. p. 158) that on June 18, 1912, he saw a pair of Tufted Ducks, accompanied by nine newly hatched young, on a Surrey pond.

Middlesex.—The species is common in the London parks, where full-winged females nest freely. Occasionally flocks visit the Zoological Gardens, where there are always pinioned birds, and in 1910 a full-winged female stayed on the Three-Island Pond and nested there, bringing off some half-dozen ducklings (Seth-Smith).

Bedfordshire.—Three pairs bred in 1911, and probably in the two previous years, on a private sheet of water (Fred. Sharman, *Brit. Birds*, vol. v. p. 114). Now breeds regularly at Woburn (J. G. M.). Mr. Steele Elliott writes that it bred at Luton Hoo Park in 1894 (*Birds of Bedfordshire*).

Wales.—It breeds in Anglesey (Coward and Oldham, *Zool.*, 1905, pp. 229, 423; Forrest, *Vert. Fauna of North Wales*, p. 287). Possibly it also breeds in Merioneth (Forrest, *Vert. Fauna of North Wales*, p. 288).

Scotland.—James Manderstone, boatman to the late Sir Graham Montgomery, at Loch Leven, Kinross, for over seventy years, told me that he always remembered the Tufted Duck as resident and breeding there. He also stated that his father, who was there for sixty years, could always recollect them. This takes us back to the middle of the eighteenth century, and it is more than probable that the Tufted Duck has been there for many centuries. It is strange that prior to 1870 the bird should have been so local in its breeding habitat, for it was always well known as a spring and winter visitor to the lakes and estuaries of Southern Scotland, the West Coast, and the Hebrides (see Gray, *Birds of the West of Scotland*, and others). Its remarkable spread throughout Scotland may be dated from the year 1875, when Mr. A. D. Brooke recorded it as breeding at Butterston Loch, near Dunkeld (see *Ibis*, 1875, p. 514). About this time my parents were living at Dunkeld, and we went one day to see the birds, in which I took much interest. There were then about nine or ten pairs on the Lochs of the Lows, as they were called. The next instance I noted of this duck breeding in Perthshire was in 1877, when Mr. P. D. Malloch killed a pair and took the nest and eggs on the Lake of Dupplin, near Perth. From this date the

species spread slowly throughout Perthshire. A few pairs bred at Murthly in 1880, and increased in numbers every year, extending to the Black Loch, Taymount, and so on up the Tay Valley and down into Stirlingshire in every direction, where lakes with marshy edges and islands were to be found. Recently Mr. Saunders stated that it breeds in more than forty lochs in Scotland, but now it would be impossible to give a correct list of all the lakes and ponds where it breeds on the mainland of Scotland, for it is found everywhere except on the high tarns, where dense vegetation ceases and insect life is scarce. It breeds commonly in Berwickshire (A. Chapman, *Bird Life of the Borders*, 2nd ed. p. 92), Wigtown (*A. S. N. H.*, 1901, p. 117), Galloway, Kinross, Stirling, Midlothian, Argyleshire, "Dee" area (Sim, p. 149), Ross-shire, and is very numerous in Caithness.

It is not within the scope of this work to give a detailed account of the growth of any new movement on the part of the diving ducks, but rather to describe their life history and their range at the present time. In consequence I must refer my readers who are anxious to trace the complete history of the spread of the Tufted Duck in Scotland to such papers as the following: "Notes on the Tufted Duck," by William Evans (*Annals Scot. Nat. Hist.*, 1896, p. 148); for further statistics, *Annals Scot. Nat. Hist.* Jan. 1896, to which there is added a good map showing the distribution in 1896; "Historical Paper (*Proc. of the Royal Physical Soc. of Edinburgh*, vol. xiii. p. 194); the various books on the local Faunal Areas of Scotland, by Messrs. Harvie-Brown and Buckley.

The species now breeds in Tiree and North Uist, where I found females and young at Balranald in 1899, and is common in South Uist and Benbecula. (See also *A. S. N. H.*, 1903, p. 245, and *A. S. N. H.*, 1907, pp. 83, 213.)

Orkneys.—Formerly rare, but now a regular winter visitor, especially to Rousay, Lochs Stenness and Harray, and the fresh waters of Sanday. The Tufted Duck was first found to breed in Orkney by myself, when I shot a female and found the nest and young on an island in Loch Stenness, July 1888 (*Fauna of the Orkney Islands*, p. 176).

Shetlands.—A regular winter visitor, but so far has not been recorded as breeding, although numbers have often been seen on Loch Spiggie in June and July. These were most probably immature non-breeding birds.

Ireland.—The spread of the Tufted Duck as a breeding species is as well marked in Ireland as in England and Scotland. As early as 1877 it was noticed as breeding on Lough Erne, and Mr. Porter-Porter tells me it now nests in considerable numbers there. In 1882 Sir R. Payne-Gallwey mentions it as breeding in the following localities: Lough Neagh, and the neighbouring Lough Beg; Mount Louise, in Monaghan; and the great Shannon lakes, &c. Since 1890, Messrs. Ussher and Warren (*Birds of Ireland*, pp. 206-207) mention it as breeding in Kerry, Cork, Clare, Tipperary, Westmeath, Longford, Roscommon, Sligo, Leitrim, Fermanagh, Monaghan, Armagh, Antrim, Londonderry. Up to the date of publication of the *Birds of Ireland*, in the year 1900, in which particulars of the breeding range are given, the authors had not noticed the species as breeding in Leinster, south and east of Westmeath, Co. Waterford, Eastern Tipperary, Connaught, west of the Shannon, Lough Arrow in Sligo, and Co. Donegal. They also note its absence in Loughs Gill and Melvin.

The species now breeds in Donegal, and in Mr. Ussher's latest list (1908), he says, "Its eggs and nestlings are now found in many counties, including Kerry (1896), and Lough

Conn, in Mayo, in 1905. Also an egg was taken on Lough Mask, Co. Galway, in 1906 (*Irish Nat.* 1907, p. 184). Probably also in Donegal."

The species is now extremely plentiful in many districts of the west of Ireland, scores of birds now breeding in some of the lakes where only a few nested when Messrs. Ussher and Warren's book was published. It is probable that in the near future the Tufted Duck will spread to every suitable lake in Ireland.

Europe.—The Tufted Duck is found generally throughout Europe, but may be said to breed only in the northern districts.

Iceland.—A rare species (Sclater, *Birds of Iceland*).

Færøes.—Said to have bred there in 1872 (Collin, *Skand. Fugl.*, p. 671).

Norway.—It breeds sparingly along the island lakes of the West Coast and in Finmark (Collett). Nests in Enare and possibly in South Veranger (Sommerfelt).

Sweden.—Nests in Småland, Öland, and Gotland; also north of Mnoriska in Lapland; Dresser states that it is tolerably abundant in Sweden, breeding in the northern districts.

Finland.—Arrives in April, and Dresser gives numerous localities where it nests, principally in the north.

Russia.—From Russian Lapland S. to 50° N. lat. in Kieff Government; on the Volga to 48°; in Voronesk, Orenburg, and N. Akmolinsk Governments to the Baltic provinces (S. A. Buturlin, quoted by Dresser).

Denmark.—Breeds rarely (H. Winge).

Germany.—Breeds throughout North and Central Germany, but not in the south. Common in East Prussia, Holstein, Mecklenburg, Brunswick, Brandenburg, Saxony, and Altenberg, also in Pomerania. Naumann has found that it bred in Germany in 1838. Speaking of its breeding haunts in Germany, R. Blasius, in the new edition of *Naumann*, x. p. 141, says:—

"In North and Central Germany they breed at special places, *e.g.* on some lakes on the east coast of Holstein; on the lakes of Mecklenburg, namely the Schwerin and Krakow lakes; formerly on the Leba lake in Pommern; on the Dreussen lake at Elbing in E. Prussia, near Thorn; near Braunschweig on the Raffteiche; in Altenburg on the Frohburg Teich (pool); in the Province of Brandenburg on the Moeser lake; and in Havelland near Berlin (according to Hocke, *Ornithol. Monatsschrift*, vi. 131); in the kingdom of Saxony on the Moritzburg pools; but so far it has not been observed breeding in S. Germany."

Holland.—Breeds in small numbers (*Ornith. Monatsberichte*, 1911, p. 44). Breeds in Brabant (A. van Pelt Leehner).

Bulgaria.—Breeds in Dobrudscha (Dombrowski); observed in June by O. Reiser.

Herzegovina.—Von Kadich (*im Zeichen d. Schwalbe*, p. 97) states that it breeds here; and this is also confirmed by Reiser.

Montenegro.—Resident throughout the year and probably breeds (Reiser, *Orni. Bale.*, iv. p. 140). Von Führer also states that it breeds in Montenegro.

Bosnia.—There are eggs and young in the Sarajevo Museum (F. C. Jourdain), and Reiser states that it breeds in Bosnia.

Italy.—Arrigoni states that there is no certain evidence of its breeding, though it has been said to do so.

Asia: Siberia.—Breeds in numbers near Obdorok in the Ob, the Yana River, N. to 70°; not rarely in the Kolyma in lat. 69° N.; the river Argun in Dauria; Lake Khanka in Ussuriland, and Transcaucasia (S. A. Buturlin, quoted by H. E. Dresser). R. Blasius, in the *Neuer Naumann*, says: "In Transcaucasia on the Goktschæ Lake, in South Siberia and Pamir, and in South-East Mongolia (Hanka Lake)." S. A. Buturlin in the *J. F. O.* for 1908, p. 284, gives the highest northern breeding limit in Europe and West and Central Siberia as 68° to 70°. Still in East Siberia it breeds up to 69° 4' 20".

MIGRATION RANGE.

Europe.—Large numbers winter throughout Central Europe where there is open water, and extend their travels far to the south of the breeding range.

In winter it is numerous on the Danube and open lakes of Silesia, Galicia, and Southern Germany. In Italy it is common from November to April (Arrigoni); scarce in Malta and abundant on all the lagoons of Corsica and Sardinia. Also common on the Marismas of the Guadalquivir, and the Laguna de la Janda in Spain (Chapman and Irby). Common in Greece (O. Reiser), in Portugal (*Ibis*, 1887, p. 377), and Macedonia (Elwes and Buckley, *Ibis*, 1870, p. 340), and throughout Turkey and the Crimea, from which I have specimens.

Africa.—A common species in Morocco (Drake, *Ibis*, 1869, p. 15), and in North Algeria, where I have seen numbers in the salt lakes between Oran and Algiers, and in the local markets (see also Locke, *Cat. M. et Ois. Algér*, p. 143; Tristram, *Ibis*, 1860, p. 81, and Salvin, *Ibis*, 1859, p. 363); also common in Lower Egypt (Shelley, p. 290); Lower and Middle Egypt, North-West Nubia and Adowa, Abyssinia (von Heuglin); the White Nile (*Ibis*, 1905, p. 385); South Abyssinia (Blanford, p. 437; *Ibis*, 1900, p. 325; 1901, p. 685; also Somaliland borders).

Asia.—Asia Minor (*J. F. O.*, 1908, p. 620; Palestine (H. B. Tristram, *P. Z. S.*, 1864, p. 454, &c.); Cyprus (common J. A. Bucknill, *Ibis*, 1910, p. 401); Caspian district, but chiefly on passage (*J. F. O.*, 1910, p. 72); Blanford, p. 302, probably also in Persia. Turkestan (*Ibis*, 76, p. 420); Afghanistan (*Ibis*, 1882, p. 125); Kohat and Kurram Valleys, Seistan, Persia, Quetta, &c. (*Ibis*, 1909, p. 283); North-West and Central India (Hume and Blanford, Stuart Baker, &c.); Mesopotamia and Aden (*B. M. Cat. Birds.*, xxvii. p. 367).

Of its distribution in India Hume gives very full details. He says it is thinly distributed in the Punjab and the Doab, rare in the Himalayas, more common in Rohilkand and Oudh, and less so in the Central Provinces and Brundelkund; abundant in Sind and Kutch, and fairly common in Kathiawar, Gujerat, Khandesh, and the Deccan; scarce in Bengal, and has occurred in Manipur. He has no information of its occurrence east of Brahmapootra, whether in Assam, Kachar, Sylhet, Tipperah, Chittagong, or British Burmah, but recently it has been noted as a regular visitor to Burmah in the cold weather (Dry Zone—South Shan States, Bhamo, and Upper Chindwin) (Major Harington, *Birds of Burma*).

It is numerous in Chota Nagpur, and occurs in Southern Konkan; visits Mysore, which seems to be its southern limit. Later observers have noted it as of regular occurrence in Cashmir, Assam, Cuchar, Sylhet, and Chittagong (Stuart Baker, p. 241).

China.—Foochow and Swatow (*Ibis*, 1892, p. 492); Fokien (*J. F. O.*, 1910, p. 479); Chinese and Formosan coasts (*P. Z. S.*, 1871, p. 419); Lower Yangtse (*Ibis*, 1891, pp. 318, 497); Amoy (*Ibis*, 1867, p. 399); Formosa (*Ibis*, 1863, p. 449).

Corea.—*Ibis*, 1892, p. 245.

Japan.—Seebohm (*B. Jap. Empire*, p. 255).

Kuriles.—(Snow).

Malay Archipelago.—Stragglers recorded from Philippines (Steere, *List of B. and M.*, p. 27, Basilan), Borneo (*Ibis*, 1890, p. 263), Great Sunda Islands, Marianne Islands (Lesson, *Traite d'Ornith.*, p. 632 (1831). (Cf. Wigglesworth, *Aves Polyn.*, p. 60, 1891, and *Cat. Birds, Br. Mus.*, xxvii., p. 365, *note*). Pelew Isles (Hartland and Finsch, *P. Z. S.*, 1868, pp. 4 and 9, and 1872, p. 90, *J. F. O.*, 1910, p. 479; *Neuer Naumann*, p. 141. Also casual in Greenland, *Ibis*, 1860, p. 166). Commander Isles (Stejneger, *Proc. U.S. Nat. Mus.*, x. p. 137).

HABITS.—Throughout its range the Tufted Duck is essentially an inhabitant of open sheets of fresh water, preferring those of moderate size that have a considerable depth in the centre, and whose shallows are overgrown with reeds and other aquatic plants. They also like lakes with numerous islands and backwaters, not too narrow, where they can sit and preen in the shallows in non-feeding hours, and whose vegetation gives them protection from the wind. In fact, all ducks that frequent open lakes of fresh water dislike draughts and take full advantage of the cover that grows along the banks, either sitting under the lee, or resting and diving at such a distance from shore that some protection is afforded. It is only in still weather or moderate breezes that they assemble in numbers on the open and deep parts of a lake, or when subject to frequent disturbance.

During the late autumn and early winter we see very great companies of these ducks such as are to be noticed on the jheels of India in the winter months, but nowhere are they to be seen in big bands in the British Islands except on Loch Leven in Scotland. Here is the true home of the Tufted Duck in Great Britain, an ideal resort of shallow bays and abundant food. It is no exaggeration to say that any time in late October or early November the observer can see companies of four and five hundred of these ducks together on a still day. Acres of water are sometimes covered with Tufteds and Pochards, and the roar of their wings as they rise can be heard at a considerable distance. In this fine sanctuary they are seldom shot or disturbed, but of late years they have increased to such an extent as to occupy the breeding ground of many increasing and more interesting species such as Wigeon, Gadwall, Pintail, &c., so that in 1911 Sir Basil Montgomery, the proprietor, gave orders for the eggs to be cleared from two small islands. The result was three large hampers full, containing some hundreds of eggs. Though Tufted Ducks are very numerous in winter in some of the Norfolk and Nottinghamshire lakes and the large lakes of Central and West Ireland, they afford no comparison to the numbers to be seen at all seasons on Loch Leven, and a visit to this interesting lake in spring or late autumn is one that ever remains green in the memory of every naturalist who has had the good fortune to experience it.

As the winter advances large companies of Tufted Ducks split up into smaller ones, so that by the end of March it is unusual to see packs of more than a dozen or twenty together. These are, as a rule, old birds, for the immatures of the previous year's hatching are always inclined to pack until the pairing season, when they too form into smaller flocks. On English lakes Tufteds are usually to be seen in small companies, or one which comprises the whole of the birds frequenting the lake. They often keep near other species, such as Pochards, Mallard, or Wigeon, but do not actually mix with them, and on rising they separate, and after wheeling round several times, depart on a line of their own.

Unless the sun is shining, when the snow-white flanks of the males appear bright and glistening, the appearance of this duck is very black. It swims low in the water, with the head well sunk between the shoulders. The tail is usually carried just above the water, but when alarmed, wounded, or bent on feeding, it can sink the body and depress the tail below, or even just under the water. At a short distance the golden eye and blue bill are very noticeable, and in the spring the eye of the male is very bright, the pupil being almost indistinguishable, especially when courtship is proceeding. If alarmed near the shore, the Tufted is very quick to apprehend danger. It raises the head, stiffens the neck, sinks the body slightly, and at once commences to swim to deep water at a considerable pace. Should it consider that it is not possible to gain a point beyond gun range by swimming, it rises at once with considerable splashing and some noise, especially if the day is calm or the wind off-shore, and then quickly rising with rapidly-beaten wings, it passes away. Before leaving a lake Tufted Ducks always circle over the water many times, sometimes rising to a height of twenty or thirty yards, and sometimes diving through the air towards the water again, which they always seem loath to abandon. The flight is rapid and very straight once the birds have decided on their course. They have a very black-and-white appearance in the air, and if the sun is upon them, even a glistening or "twinkling," which can be recognised from a great distance.

In descending on the water, they sometimes do so abruptly if there is a good head wind, but if the day is calm they flutter at a lessening speed above the water and alight somewhat heavily on the surface. I have never seen one rise from the land. They waddle quickly to the water and rise from it. Even a female, flushed from the nest, half flies and half runs down to the water before mounting to the air. Mr. Dresser quotes Robert Gray (*Birds of the West of Scotland*, p. 386) with reference to the habits of this duck in the West of Scotland in winter. The latter, an excellent authority as a rule, says: "More frequently obtained in severe winters than in open seasons. This may arise from its habit of keeping out at sea, or well off shore in the firths and estuaries in moderate weather, and coming into our rivers to feed when it is too rough outside, &c." After a lifetime spent in the haunts of ducks in Scotland, I can say that this is a totally erroneous view of the circumstances which lead to the appearance of Tufted Ducks on the Clyde in winter. Gray states that the birds are more frequent in severe winters than in mild ones, and this is due to the fact that Tufted Ducks are not dwellers on the open sea, or even the estuaries of Scotland, unless their true homes, which are freshwater lochs, are frozen hard. When driven by frost from the lakes of the east and north, large numbers of Tufted Duck pass to the west and south where there is always some open fresh water, and if this is not found, to the brackish estuaries of rivers such as the Clyde, where I have seen them in some numbers. The Tufted Duck is essentially a freshwater and not a sea duck in any sense of the word, and I have only once seen (September 1885) and killed a Tufted Duck on the open sea, which was on the coast opposite Tents Muir in Fife. I can firmly believe that in long-continued frosts such as are frequently experienced in Scotland in winter, the main body of Tufted Ducks migrate far to the south, namely to Southern Europe and North Africa, and return again in February and March. In hard winters I have seen companies of Tufted Ducks only in the estuaries of the Tay and Eden. If the winter continues to be severe, they disappear altogether. Many, however, remain the entire winter in the Hebrides, a few in

Orkney and Shetland, and many on the lakes of Wigtown, S.W. Scotland, and Ireland, owing to their haunts in these places seldom being frozen.

Speaking of the winter habits of the species in Germany, Naumann says :—

“Although they seem fairly unsusceptible to cold, as long as ice does not entirely close the pieces of water to them, yet for all colder lands they remain birds of passage. From September or the beginning of October onward they assemble in small companies on larger sheets of water, and these flocks grow bigger in proportion as the year advances until finally in November or December they have become flocks of many thousands; at the approach of frosts they endeavour to prevent the complete freezing of certain places on the water by continued movement, and all at first start on their journey together if they can no longer succeed in doing this and the water is altogether covered with ice. They wander off in great flocks in search (of water), from which only a few occasionally through some mishap become separated, for afterwards on still-open places on the rivers you seldom come across Heron-duck (Tufteds), and these will soon follow after, so that, in the middle of the winter (unless it is quite a mild one) there are none to be seen in our country. Whilst those assembled in the north and east of Germany desert us in order, some of them to winter in southern lands in Switzerland, Italy, and Hungary, on large inland lakes, or on the sea coasts.”

Some remain on the sea or the N. and E. coast of Germany, but generally about the tidal estuaries. Their appearance on the open sea Naumann very rightly regards as exceptional.

During the day the companies of Tufted Ducks spend most of the time in resting, preening, and feeding, but as evening comes on they become restive and keep much on the wing. Like many other ducks, most of their journeys are performed at night, which fact is proved by their frequent disappearance from certain lakes and appearance in the morning on others. When travelling over short distances the flight is generally performed within gunshot of the land or water, but when making longer journeys they mount to a considerable height in the air like the Golden-Eye. They generally fly in very close irregular companies in a swift arrow-like manner, swinging and swaying to take advantage of any wind-breaks, hills, woods, &c. In summer single pairs of birds will resort to any pond that is quiet and undisturbed, preferring those that are well lined with sedge, rushes, grassy banks, embankments, and heather islands. In autumn the immatures may be found even in pools in fields, wide drains, and large sewage tanks. I have killed several in an unsavoury bog right in the heart of the town of Glasgow known as the 'Postle Marsh, but they do not seem partial to swift-flowing rivers, and if found there it is certain that they are only on passage. As a rule they come ashore on long low tongues of land or small islands from which a good view may be obtained, and are very quick to take alarm given by the cries of other birds or the use of their own eyes. During gales of wind they are very clever to take advantage of the shelter of islands or headlands, and yet remain on the water just out of shot of any spot that may hide a gunner. Resting on the water they appear to be asleep, yet their little feet are in motion all the time so as to prevent the wind from drifting them too far into rough water. Thus they will maintain one position for hours at a time.

Tufted Ducks are not as a general rule very shy birds, and if protection is afforded them soon become remarkably tame. It is only on large sheets of water that they are difficult to approach. Even in such places they soon become accustomed to the passage of trains, carriages, or farm-carts, and recognise, like all ducks, the various degrees of danger



Walter L. Cell, Jr.

O. Murray Dixon 1911

Tufted Duck coming into shelter.

to be attached to each separate cause of disturbance. Even the individual man is separated into various categories by them, for the stealthy gunner is avoided with greater care than the casual fisherman or the digging labourer. I have had difficulty in shooting a few Tufted Ducks in the spring-time on Loch Leven, and, when fishing for trout, the next day have been surrounded by them at close range. On small lakes and pools they are usually more confiding, and seem loath to leave them even when forced to wing. Females with young, too, show less fear of man than any other British duck. It is even possible to catch them by casting trout flies over them. Naumann instances a lake in Germany where these birds are so tame as to be regularly fed by the public from the bridge just as they are in St. James's Park.

On shore they walk slowly and clumsily, with a decided roll. On the water they are expert divers, and, when feeding, keep in close companies. When feeding they dive all together or very quickly one after the other, remaining below from a few seconds to a minute (generally 50 seconds). They are very buoyant and rise to the surface with a "jump" at different points, when they at once reassemble and commence diving again. In this manner they spend a great part of the day. When at the bottom, in clear water, they probe the mud, sand, or pebbles in search of food, and, like the Golden-Eye, I have seen them turn over stones of considerable size with the bill. The food is swallowed under water as a rule, but if a fish, frog, or large piece of succulent root or vegetable matter is found it is brought to the surface and crushed or broken up before being swallowed.

When diving for its food the Tufted Duck makes a full semicircle with the head and neck, and, giving a vigorous kick, passes quickly out of sight, leaving a boil on the troubled waters. It remains below the water from a few seconds to half a minute, and finds most of its food on the bottom. Like most of the freshwater diving ducks, it will take quantities of food on the surface such as flies, diptera, and duckweed, of which it is especially fond. Even when quietly preening on shore I have seen a Tufted Duck dash at and swallow a small frog that incautiously sprang into a shallow beside it. Most authorities speak of the food as being entirely animal, but this is not the case. Dresser, however, does not make this mistake, and correctly states that it will eat roots, seeds, and the buds of aquatic plants. I have never seen the Tufted Duck actually feed on land, for we must not regard habits developed in confinement as natural. Its chief food consists of aquatic animals of various kinds, freshwater mussels and snails, insects, frogs, and tadpoles. Various Tufted Ducks that I have kept in confinement caught quantities of flies, water-beetles, small fish, and ate large quantities of pond-weed. They can, however, be easily "fed off" on to grain.

"In the stomachs of some killed in Bavaria," says Naumann, "Jäckel found (*Vog. Bayenne*, p. 337), fish-spawn, a grass frog (*Rana esculenta*), mussels (*Pisidium fontinale*), the larvæ of *Phryganea* and *Ephemera*, and the seeds of *Polygonum amphibium*, *Persicaria* and *Lapathifolium*, *Rumex* and *Potamogeton*."

The stomachs of Tufted Ducks generally contain a quantity of sand, fine shells, or small stones.

The usual cry, uttered by both sexes, but somewhat louder and harsher in the case of the female, is "korr, korr, korr," or "ka-ka-ka, karr." They emit this when rising,

quarrelling, or suddenly alighting, or on being scared. The call of the male in spring is a low gentle whistle, and the onlooker must be at close range to hear it at all.

Early in March the large flocks of Tufted Ducks split up into smaller companies, and if the weather is fine, and they are observed with the glass, it will be seen that a constant commotion is taking place amongst their ranks. Two or three males are sometimes to be seen "showing off" before a duck, and, vice versa, some drakes seem to have a decided attraction for the females, which swim rapidly round and alongside them, dipping their bills frequently, and uttering their harsh call. The courtship of the male Tufted Duck is probably the most undemonstrative of any of the *Anatidæ*. I myself, and such good observers as Mr. Gerald Legge and Mr. Hugh Wormald, who have these birds constantly under notice both in a wild and domesticated condition, have never seen any show on the part of the male except the following: The male swims rapidly past the female but without turning his head in her direction, and extends the neck to its full length. At the same time the bill is raised to an angle of 45° , and retained in this position for some seconds, whilst it utters frequently a low gentle whistle something like the word "hoi," and well-nigh impossible to express onomatopœically. In many cases in which male birds are furnished with ornaments of exceptional beauty, we notice that these parts are displayed in courtship, but in the case of the Tufted Drake, the bird seems to be incapable of displaying his long crest in any fashion, for at the period of courtship it hangs limp at the back of the head as at other seasons. In moments of excitement the pupil of the eye almost disappears, as it does in so many birds, and the golden iris seems to blaze with unusual fire.

Writing on April 4, 1911, Mr. Gerald Legge says: "I have been watching the courtship of the Tufted Duck, such as it is. There are now a nice lot of breeding birds on the lake (Patshull). A few days ago I watched a flock of thirteen at close range. There were three drakes courting one duck, and as far as I could see they did nothing but raise their heads, not a 'bob' like a Shoveller, but straightened out their necks and held their heads up for quite a long time; then they lowered them and did the same thing again. What I wish to explain is that they did not bow like other ducks, but the whole proceeding was much slower. The drakes kept up that curious mewling whistle, and I could not see that they raised their crests at all."

Since the foregoing was written I have had a letter from Mr. Hugh Wormald, who writes (May 7, 1912): "I saw a male Tufted Duck in display the other day. He threw back his head exactly like a Golden-Eye. I had not seen a Tufted do this previously, though I believe that all diving ducks adopt this attitude in courtship." Under any circumstance I think that the attitude must be rare in the case of the Tufted Duck, and only adopted, perhaps for a day or two, when the bird is in full show.

Additional proof that the male Tufted Duck does throw back his head in the same manner as the Ferruginous Drake is furnished in a note written by Mr. Gerald Legge (June 7, 1912). He says: "I have now at last seen the male Tufted Duck exhibit his full show, I was watching two drakes with the glass. They were on the other side of the pool at Patshull, and were both about three yards from the bank and facing it. They repeatedly threw back their heads very quickly, just like the male Ferruginous. I went round the pool, and discovered on the bank, close to the spot where the drakes were 'showing,' a female Tufted on her nest, with seven eggs."

On large lakes, like Loch Leven, where Tufted intend to breed, most of the adult birds are paired off by the end of March, and keep closely together during the early part of the breeding season. There are, however, many small lakes and ponds where Tufteds breed, which are not frequented by the birds in winter, owing probably to the fact that they have been frozen. On these the Tufteds arrive in one small flock late in February or early in March, and at once commence courtship and pairing. As soon as they are paired they become very tame, and it adds much to the charm of a day's spring fishing on Loch Leven to see these charming birds, with hosts of other ducks, circling round the boat, and taking but little notice of intruders in their sanctuary.

Considering the fact that Tufted Ducks pair early, it is somewhat curious that they are not by any means early breeders. It is not long before they seek out a suitable nesting site, but it is generally well into May before the females think of nesting. The site chosen is generally only a few yards from the water, often amid dense herbage, or the top of a sloping bank on some island, tongue of land, or embankment. At Patshull eight or ten nests are annually placed on a low dyke separating two small lakes. The distance of each nest from the water would be two to five yards, and the site hidden in rushes and coarse grass, where a few stunted willows grow. I have found them with little covering but a few grass blades, and at other times, some twenty yards from the water, in a thicket of willows, Scots fir, bramble, and reeds. A favourite position is in centre of a tuft of rushes, only slightly raised above the level of the lake. Naumann says they will travel as far as eighty to one hundred paces from the water to make the nest in a clump of sedge or osier, rushes or tufts of grass, in places once wet and now dry.

Tufted Ducks will sometimes choose very curious nesting sites. Mr. P. D. Malloch sends me a photograph of a nest, with six eggs, which he found upon the high wall of the old castle, on the Castle Island, Loch Leven, in June 1900. The bird must have flown directly up to her nest from the waters, 80 or 100 feet below. There is no doubt that diving ducks usually swim in to the land near their nest, and then, after carefully surveying the landscape, walk into their nests. But this is by no means the invariable practice, for I have noticed, by personal observation, that many of them fly directly in from the lake and alight close to the nest. This fact Mr. C. Farren has also recorded in *Country Life*, May 14, 1910.

In England female Tufted Ducks generally commence to lay about May 18-20. In Scotland the time is generally a week to ten days later, whilst in Germany they commence to lay at the beginning of June. The nest itself has usually a somewhat slight under layer of dry rushes or bent grass and bits of sedge; the upper parts are chiefly loosely-woven fine blades of dry grass. The basin in the centre has a depth of 14 centimetres. The usual number of eggs is 8 to 10, but sometimes many more are laid. Thus clutches of 16 to 17 are recorded from Caithness (T. E. Buckley); 14 from Ireland (R. J. Ussher; Newton mentions a case of 21. Mr. F. C. R. Jourdain has taken nests with 15, 11, 12, 16, and 18 eggs, but considers that, in the last instance, it was a case of two ducks laying in the same nest. In a note to me he says: "I once saw in Derbyshire a female Tufted Duck sitting on the top of a pile of no fewer than 28 eggs, which she was quite unable to cover, but believe that in this case about five ducks were laying in the same nest." E. C. Stuart Baker mentions an instance of 40 eggs being found in one nest, but does not

give details. A description of the down in the nest of the Tufted Duck is given in *British Birds*, vol. ii. p. 37 (pl. 2, figs. 4, 11).

Mr. Heatley Noble, in a note to me, says: "The Tufted Duck is a very late breeder. On June 6th we saw upwards of 60 nests on an island in Loch Leven. The *average* number of eggs in a nest is about nine, the largest number seen was fourteen. Some nests were close to the water's edge, others in the middle of the island. In grass generally, and well lined with down. I hatched out one nest under a hen, incubation lasting twenty-three days. When first hatched the young shuffle about like toads, and seem unable to walk. They do not breed readily on ornamental waters as a rule, but in St. James's Park, where all the ducks are so tame, I have been shown many nests."

Whilst the female Tufted Duck is laying her eggs she is joined by the male immediately she has left the nest and reaches the water. Pairing then takes place. But immediately the female commences to sit the males seem inclined to join together, and form in little parties. This flocking of the males becomes more marked as the month of June goes on until June 20th, when they show a disposition to leave the home lake for a night or two. After this date they often disappear altogether till the late autumn. It is very difficult to say where all the parties of old males go to after leaving the breeding haunts, but there is no doubt that many of them resort to other waters in the vicinity which are never frequented in the actual breeding season. We should imagine that on a large stretch of water like Loch Leven the old males would not leave, as sufficient quiet retreats would be found at a distance from the females and young; but such is not the case, for in July and August it is very difficult to see a single old male on the whole lake. Where they go to in this district I do not know. In Nairn and Elgin I have found old males in August and September, singly or in small parties, on pools and lakes where the species do not breed, and on being disturbed or shot at, they pass away and do not return for many days. I fancy that from June to October (when the males reassemble at their usual winter resorts) the old males are wanderers from one small lake to another, and do not stop long in any one place, particularly so if they are disturbed. Mr. Gerald Legge states that the old males leave Patshull regularly about June 24th to 26th, and this seems to be about the date that they leave their breeding haunts in England. During the eclipse and moulting period the old males seem to like to hide themselves in dark backwaters and out-of-the-way places, where they may be little observed—a characteristic habit of all ducks at this period. Naumann thinks they retire to the sea, but this is certainly not the case in the British Isles.

The incubation period is somewhat variable, lasting from 23 to 28 days (see also *Field*, July 3, 1909, and July 30, 1910—28, 24, 27, and 23 days—and Evans, *Ibis*, 1891, p. 73). Mr. Gerald Legge says 24 days is the usual period of incubation, and Mr. Heatley Noble (*Field*, July 10, 1909) 23 days. Mr. Hinton in 1910 kept notes of three nests which hatched out in 24, 27, and 25 days, whilst Major Trevelyan (*Field*, July 29, 1911) says that eggs placed under a hen hatched in 1909 in 28 days, and in 1910 in 26 days.

A female sits very close, and only deserts her nest in presence of urgent danger. She plucks her breast of the dark-grey down, and surrounds her eggs with it, as well as covering them with it when necessity compels her to obtain some food. When the young escape from the eggs, they follow the mother at once to the water, and crowd very closely round

her as she swims. If disturbed by man, she will fly a short distance and dive, when the young, even if very small, at once imitate her movements. In a very few days the young are expert divers. During the first days of life the young are largely fed by the mother, or, to speak more correctly, have food placed before them by the parent, who obtains it from the bottom, and then breaks it up, when it is at once swallowed by the hungry brood. All the time she is so engaged the latter are busy catching flies and *diptera* on the surface as they swim along.

Young Tufted Ducks begin to dive very soon after they enter the water. Mr. Wormald allows his young birds to enter a pond and seek for food as soon as they are hatched. As instancing their lack of knowledge in the art of diving and their quick acceptance of this method of gaining their food, Mr. J. Whitaker tells me the following interesting fact, which he noticed at Rainworth in the summer of 1912. A female Tufted Duck led her bunch of young ones, which had just been hatched, to the middle of a pond. She then dived immediately; the young rushed in every direction on the surface of the water, evidently under the impression that they had lost their mother. She reappeared in a minute, however, and all the brood hurried to her side. At the next dive they did not appear to be so frightened, but looked about waiting for her reappearance. The third time she dived two of the young ones copied her movements, and in a very short period the whole of the family were diving with their mother in quite professional fashion. This little incident shows how quickly education may be completed in birds whose instincts naturally trend in certain directions.

At first the young appear very black, but in a few days they look brownish grey, till by the end of August they are somewhat difficult to distinguish from the mother. The adult females stay with the young until they can fly, when all gradually work together and are joined by the adult males in the usual winter resorts in October. On Loch Leven the adult females and young do not leave the loch at all during the first year, and this probably holds good on all breeding resorts which are also winter habitats, whereas females and young that have passed the summer on small lochs, lakes, and ponds generally leave in September for larger sheets of water, their places being taken by other migratory duck, which in turn also pass on.

Owing to their facility in diving, Tufted Ducks suffer little from birds of prey, which seldom molest birds living on the water or flying immediately over it. Foxes catch a few on their nests and possibly others, but their chief enemy in Scotland is the Hooded Crow, which annually destroys thousands of ducks' nests. Mr. Malloch tells me that one day, when fishing on Loch Leven, he saw a Hoodie watching a Tufted on its nest. Immediately the mother left her nest, doubtless to get some food, the marauder swooped down and immediately broke every egg, carrying off one on its bill. Gulls also destroy a few nests that are placed in exposed situations.

Certain parasitic insects are found in the feathers, such as *Docophorus obtusus* and *Docophorus icterodes* (Nitzsch), whilst in the intestines are worms similar to those found in the Pochard, namely, *Ascaris fuligulæ* (Gm.), *Strongylus modularis* (Rud.), *Strongylus acutus* (Lundahl), *Echinorynchus polymorphus* (Brens), *Distomum oxyurum* (Creplin), *Distomum globulus* (Rud.), *Distomum echinatum* (Zed.), *Monostomum attenuatum* (Rud.), *Taenia megalops* (Nitzsch), *Taenia leavis* (Bloch), *Taenia sinuosa* (Zed.), *Taenia trilineata*

(Batsch), *Echynorhynchus stellaris* (Molin.), *Distomum recurvatum* (Linst), *Holostomum erraticum* (Duj.).

On the whole the Tufted Duck is not very easy to shoot on large sheets of water. But even in such places they may be stalked from behind banks or through woods, and watched when swimming within shot of the shore. When the flock is found on feed the gunner can then run in and obtain his chance as the birds rise to the surface. When little disturbed it is possible to sail within gunshot of a flock on the open water, but the old birds are usually difficult to obtain in this way unless they are "cornered" in some backwater or arm of the lake, when they will not fly overhead but pass within shot to the open waters of the lake. I have killed many by lying hidden on small islands in Loch Leven. There they will pass at close range on stormy days, but always keep well out of shot of the larger islands. Winged birds shot from the shore are seldom recovered unless shot again at once before they commence to dive, but from a boat winged birds may be tired out and killed more easily than Pochard or Scaup, since they neither possess the constitution nor vitality of these ducks.

On small lakes or ponds Tufted Ducks are easily shot, as there is always some corner or point of land where the gunner can stand in bushes and hide himself to intercept them as they leave the place. It is merely necessary to find this spot and send a man round to drive the birds and they will come straight to the gunner. Moreover, in leaving small sheets of water Tufted Ducks do not rise high, and so offer an easy mark.

In confinement the Tufted Duck is one of the easiest and most charming to keep in good health. I have kept many, and found they soon became tame and sociable with other water-fowl.

Tufted Ducks were first exhibited at the Zoological Society's Gardens in 1831, and up to the year 1848 bred regularly in the "Three-island Pond," and almost every one who has kept these birds in company with other surface-feeding and diving ducks, and given them suitable nesting sites, has succeeded in breeding them. In confinement they are easily kept on Spratt's biscuit meal, crissel, barley, wheat, with for a change buckwheat, oats, hemp, and crushed Indian corn (H. Wormald). They will eat quantities of pond-weed, and in the winter Mr. Wormald uses chopped marigolds, turnips, potatoes, and grass as a substitute for weed. I have found my Tufted Ducks soon ate soaked bread, a food to which the birds in St. James's Park seem very partial. When rearing young Tufted Ducks, or the young of any diving species, it is a mistake to allow them to go by themselves into deep water. A flat zinc tray 6 inches square by $\frac{3}{4}$ inch deep is used by Mr. Wormald and found efficient by other rearers. In this should be placed hard-boiled eggs chopped fine and mixed with wild-duck meal and bread crumbs, whilst duckweed, dried flies, and ants' eggs should be floated on the surface of the water. "It sometimes happens," says Mr. Wormald (*Notes on the Management of Ornamental Water Fowl*, p. 13), "that young ducklings with a foster-mother refuse to eat anything; they may often be induced to pick if the food is sprinkled about the level of their bills on blades of grass, or even on the backs of their companions; any moving object such as a spider suspended above them by the web, or a fly crawling up the side of their foster-mother, may induce them to take their first meal, and, once started, they soon learn to pick up their food. Duckweed especially is a great help to the young birds, as it will be found to be full

of animalculæ, small water-beetles, larvæ of gnats, &c., all of which form natural food." All who wish to rear any of the young of surface-feeding or diving ducks, or keep them in good health, will do well to procure Mr. Wormald's excellent little book, as it is thoroughly practical and sound in all its details.

A great number of hybrids between this species and other ducks have been recorded. Suchetet alone (*Oiseaux hybrides rencontrés à l'état Sauvage*) records many. The cross with the Common Pochard seems to be the most common. I possess two examples of this and have seen over a dozen others. The hybrid with the Ferruginous Duck also is not rare, and the two species will cross freely in confinement. Other species with which the Tufted Duck has crossed are *Aix sponsa*, *Nyroca marila*, *Querquedula crecca*, and there have been numerous hybrids *inter se*.

SCAUP DUCK

Nyroca marila (Linnæus)

- Anas glaucium minus striatum*, Briss. Orn., vi. p. 416 (1760).
Anas marila, Linn., Fauna Suecica, ed. ii., p. 39 (1761).
Anas marila, Linn., Syst. Nat. (ed. xii.), p. 196 (1766).
Anas subterranea, Scopoli, Ann. i., Hist. Nat., p. 67, No. 83 (1769).
Le milloninan, Buff. Hist. Ois., ix. p. 221 (1783).
Anas fraenata, Sparrm. Mus. Carls., fasc. ii. pl. 38 (1787).
Aythya marila (Linn.), Boie, Isis, 1822, p. 564.
Fuligula marila (L.), Steph. in Shaw's Gen. Zool., xii., ii. p. 198 (1824).
Platypus marilus (L.), C. L. Brehm, Lehrb. Naturg. eur Vög. ii. p. 830 (1824).
Nyroca marila (L.), Fleming, Brit. Anim., p. 122 (1828).
Athya islandica, C. L. Brehm, Vög. Deutschl., p. 911 (1831).
Athya leuconotos, C. L. Brehm, *op. cit.*, p. 913 (1831).
Fuligula gesneri, Eyton, Cat. Brit. B., p. 58 (1836).
Marila frenata, Bp. Compt. Rend., xlii., part ii., p. 651 (1856).
Fulix marila (L.), Baird, B. of N. Amer., p. 791 (1858).

LOCAL NAMES.—Scaup, Scaup Duck, Blue-bill, Mussel Scaup, Black Pochard, Black Curre (*English*); Greater Scaup Duck, Greater Broad-bill, Blue-bill (*N. America*); Canard milouinan (*French*); Moretta grigia (*Italian*); Bergente, Moorente (*German*); Patka crninka (*Croatian*); Kaholka (*Czechish*); Bjergand (*Danish and Norwegian*); Hvitbuk, Bergand (*Swedish*); Dukönd, Hrafnstönd (*Icelandic*); Toppereend (*Dutch*); Tunturi-sotka (*Finnish*); Goloubaia-Tschernett, Beloglaska (*Russian*); Andt (*Faræese*); Nakihashjro-gamo (*Japanese*); Stuora fietag (*Lappish*); Kaczka ogorzalka (*Polish*); Buixot (*Spanish*); Hegyi recze (*Hungarian*); Hwyađen Lygad Arian (Silver-eyed Duck), Hwyađen Benddu (Black-headed Duck (*Welsh*)).

Egg.—In shape rather broad and regular oval; colour, stone-buff and not glossy; size, from 2.45×1.67 to 2.5×1.77 inches. I found the usual number in Iceland to be from 7 to 10. Mr. Jourdain says 8 to 11 is the usual number. In Iceland 19 eggs were found in one nest (*Ornithologist*, p. 126), whilst Krüper found 22 in one nest (*Naumannia*, 1857, p. 44).

Many authorities give different measurements of the eggs of this bird, so I quote some exact measurements and weights of eggs kindly sent me by Mr. F. C. R. Jourdain:—

“Average size of 100 eggs in millimetres is 61.77×43.6 . Max. 68.1×44.7 , and 59×48 ; min. 54.5×41.5 and 66.3×40.7 . Average weight of 54 eggs, 5.73 gr. (4.92 to 7.089 (Goebel). Rey's average for 35 = 5.79 g. (4.95 to 7.22 g.).” In shape they are much like those of the Tufted Duck; the female incubates alone for four weeks (Hantzsch), and young are fledged in five or six weeks (Hantzsch).

Young in Down.—Dresser's description of the young in down is a correct one. “Crown, nape, and upper parts, uniform dark olive-brown; throat, sides of the head, and forepart of the neck, yellowish-white; a dull greyish band crosses the lower neck, rest of the under parts dull yellowish; the flanks, greyish-yellow; upper mandible, blackish,



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SCAUP-DUCK
adult male and female

with often beak yellowish; under mandible, yellow." The female young in down is said by Naumann to be distinguished by a greenish tinge on the under parts.

Immature Male.—In first plumage in September the young male and female are very similar, except that the upper part of the wings of the young male, instead of being uniform brown, is slightly vermiculated with greyish-white; the head, neck, chest, nape, and mantle are dull brown, and in both sexes there is a space of dull whitish-brown about half-an-inch broad behind the upper mandible. The brown chest feathers are above edged with sandy-brown, and below, where they join the under parts, edged with white; lower belly, vent, and under tail-coverts, mottled with pale-brown; under parts, white: back and rump, very dark brown, the back feathers being finely vermiculated with whitish-grey; primaries as in adults, only paler; secondaries, white and edged with dark brown, the dark marking increasing as they join the wing-coverts, which are very dark brown; upper parts of wings, dark greyish-brown, and slightly vermiculated; tail, dark brown. By the middle of October there is a very considerable advance in the plumage of the young male; the dark brownish-white space on the lores is also interspersed with blackish-green feathers, which extend all over the head and neck; the brown mantle and back are moulted to grey, heavily vermiculated with dark brown; whilst the scapulars show the first adult white feathers more finely barred. There is a very distinct colour change in the pale-brown flanks, which, although not yet moulted, now show pale-grey vermiculations; as yet there is no change in the chest. At the end of October the first black feathers appear on the lower chest, and in some instances the young males have nearly lost the whitish feathers on chin and lores. So the plumage goes on advancing through November and December, principally on the back, scapulars, mantle, and upper chest, whilst the head and neck is often complete in the end of the latter month. These advances are, however, by no means regular, and are doubtless due to the early or late hatching of the young bird. for I have often shot young males in February, which have not yet cast the last white feathers of the lores.

The lower chest is generally the last part of the immature plumage to be cast, and this portion of the plumage is often still unshed by the beginning of May, whilst all the rest of the plumage is similar to that of the adult male (see Fig. 8). The wings too are also variable, some young males moulting all the upper parts in March and April, others not doing so until the principal moult in July and August. The young male Scaup do not pair and breed as some of the other members of the genus do in their first spring, but remain in parties on the breeding grounds, shedding the last of their immature plumage in July, and assuming an eclipse similar to the adult male. They are therefore only mature at twelve months. In the second spring the male pairs and breeds, but its full beauty is not assumed until the third season.

Adult Male.—Head, neck, upper breast, nape, and mantle, black; the head and upper neck glossed with green and purple; back and scapulars white, and narrowly barred with black, line markings being fainter as spring approaches; lower breast, under parts, and flanks, white; vent and last flank feathers vermiculated with fine black lines; rump and under tail-coverts, black; tail, dark brown; wing-coverts, black, finely vermiculated with white; primaries, blackish-brown, with whitish area on the inner web; secondaries, white, and margined with a black band, sometimes flecked with white; upper wing-coverts

and wings, dull black, finely vermiculated with white; bill and legs, bluish lead-colour; webs and nail of bill, black. Length, 18 to 20 inches; wing, 9.25 inches; tarsus, 1.4 inch; bill along ridge, 2 inches. Irides, rich golden yellow.

The adult male is somewhat late in assuming its eclipse dress, and seems to require to be in good health to attain it, for both Pochards and Scaup which I have kept in confinement have not fully changed as the wild birds do. About the middle or end of July the adult male passes into a fairly complete eclipse. The whole of the wings, scapulars, back, rump, tail, and chest are at once moulted direct to the winter dress, a feature of the chest feathers being a broad band of white on the edge of every feather. But an intermediate or temporary plumage for July, August, and September is furnished in a large number of eclipse feathers for parts of the head, neck, nape, mantle, and flanks. The head becomes a dull brownish-black, showing light-grey on the cheeks (due to the old winter feathers reaching the extremity of their length). A few white feathers come into the lores (showing a distinct affinity to female plumage), the neck assumes a grey collar, and the nape and mantle, instead of being black, are filled with new grey and black vermiculated feathers similar to those on the back. The flanks, instead of being white as in spring and winter, are now filled with white feathers finely vermiculated with brown. All these new eclipse feathers are again moulted gradually. From the end of September, when the bird is still in eclipse dress, till the end of October new winter feathers are constantly coming in and displacing the old ones; and the full winter plumage is not assumed until November.

The trachea or windpipe of the male is somewhat broad in the upper portion but narrow towards the bottom, where it branches into the two bronchial tubes. At that point of division is situated the bone-like drum, which is very similar to that of the Tufted Duck, but having a larger chamber on the left side. This, too, has a transparent skin-opening, divided from top to bottom by an arch of bone. On the right or smaller chamber the outer skin is divided by a network of bone in the several smaller pockets. The weight of five adult male Scaup, taken December 1891, was 40, 40, 41, 42, and 42 oz.

Adult Female.—Forehead, lores, and chin, white; head to centre of neck, dark brown, and in the case of old females, nearly black; chest, nape, and mantle, brown; lower chest ribbed with white where it joins the white under parts; back and scapulars, brown, vermiculated with white; rump, blackish brown; tail, brown, with a greyish sheen; under tail-coverts, brown, vermiculated with white; flanks, alternate rich brown, and white vermiculated with fine black lines; wings as in the male, only that the upper parts are darker and more faintly vermiculated with grey. Length, 18 inches; wing, 8.75 inches; tarsus, 1.33 inch; bill along ridge, 1.83 inch. Bill lead blue and slightly darker than the male; feet and legs similar to male, but not so bright.

Like the female Tufted Duck, the female Scaup Duck has a somewhat distinct breeding dress. An adult female which I shot off the nest at Myvatn, Iceland, June 20, 1891, has the whole of the body and under parts of white, heavily interspersed with brown feathers. The back and scapulars also have a number of brown feathers which appear to be new, and the whole general tone of the head, neck, and chest is a richer and warmer brown; there are also a few blackish feathers on the lower edge of the chest shield; the flanks have also

a number of new rich reddish-brown feathers. The white on the face is much faded and speckled with small brown feathers. Except for the wings, the lighter face markings, and size, the female Scaup bears a strong resemblance to the female Tufted Duck at this date. The weight of four adult female Scaup, taken December 1891, was 33, 34, 35, and 35 oz.

Immature Female.—The young female in first plumage is somewhat like the young White-Eye, but is larger (especially the bill). A distinguishing feature is the somewhat brownish-white lores and chin, which in the White-Eye is pale brown. In young female Scaup the forehead is generally brown, not white, as we should expect. The head, neck, chest, and region of the vent is pale brown; mantle dark brown, finely vermiculated with grey; scapulars dark brown, with light sandy-brown edges; wing-coverts, rump, and tail similar to adult female, only less rich in colour; tail of immatures always brown at the tips; flanks, pale brown, edged with sandy yellowish brown; wings similar to adults, only less vermiculated; bill similar to adults, only darker; feet also darker. A gradual moult continues from October until the spring, when the young female has assumed a dark brown head, and the whole plumage is very similar to the adult, except that a large number of immature feathers are retained on the flanks, a few on the scapulars, and the greater part of the lower chest. Like nearly all immature plumaged duck, young female Scaup do not pair and breed the first spring, but keep apart in parties on the breeding grounds, gradually moulting their immature dress. In August the principal moult takes place, and by October the female full dress is assumed, *i.e.* at fifteen months. The female pairs and breeds the second spring, but its full beauty is not reached until the third year. In the immature state the irides of both young males and females are yellowish-brown.

BREEDING RANGE.

British Isles.—During my constant journeys amongst the northern lakes of Scotland and the Orkneys and Shetlands, I always expected to find the first breeding place of the Scaup in our islands, and took more than one journey for the express purpose of finding the nest on certain lochs where pairs of Scaup were spending the summer, but was always disappointed. I had known Scaup to stay annually throughout the summer on Loch Stenness, Orkneys, and in July 1888 my boatman stated he had found the nest. I left London by the first train, and two days later shot the female, which proved to be a Tufted Duck, from the nest. The same day I saw two pairs of Scaup on the lake. This was the first of my disappointments, for the Scaup continued to frequent Loch Stenness in summer. I have little doubt they bred there, or on Loch Harray, for I shot young birds just able to fly at the end of August. There are lakes in the Shetlands where it is possible to see Scaup every summer, but there is no authentic record of their breeding there yet; and this is somewhat curious, for both the Orkney and Shetland birds there noted in summer were adults, sometimes evidently paired, and not immatures or “pricked” birds unable to migrate. The first nest of the Scaup found in our islands was discovered by Captain Sandeman and Mr. Heatley Noble on a loch in Sutherland (*A. S. N. Hist.*, 1899, p. 215). It contained nine eggs. In the Outer Hebrides Scaup have nested almost regularly since 1897. Mr. J. H. Harvie-Brown states (*A. S. N. Hist.*, 1902, p. 211) that nesting took place “south of the Sound of Harris” in 1897, 1898, 1899 (two pairs); 1900 (three pairs); probably in 1901, and certainly in 1902. Scaup bred in South Uist in 1902 (*A. S. N. Hist.*, 1903, p. 76), evidently a record of the same birds. A nest with nine eggs was found in the Uists in 1906 (N. B.

Kinnear, *A. S. N. Hist.*, 1907, p. 82; P. H. Baker, *t.c.*, p. 213; see also *Brit. Birds*, II., Dec. 1908, p. 209). A friend who rented the winter shooting of South Uist in 1911 tells me Scaup bred there in the previous year (1910). Thus it is evident that the species will be established in South Uist if the owner of the property, Sir R. Cathcart, will give the birds efficient protection.

I shall not be surprised if we hear of more nests of the Scaup being found in the mainland of Scotland in the near future, for I know of certain lochs where they show a greater disposition every year to prolong their stay.

Faroes.—A few stay to breed (*Zool.*, 1872, p. 3255; *J. F. O.*, 1889, p. 374). The late Mr. Müller told me that a few pairs nested regularly in some lakes a few miles from Thorshavn.

Iceland.—Very common on all suitable lakes; I travelled 800 miles over the interior of Iceland in the summer of 1889, and saw Scaup on nearly every lake that was not too deep. It is especially abundant on the Myvatn Lake and the banks of the slow-flowing Skalfandi Laxa, where I saw hundreds of nests. It has been stated (*Ibis*, 1886, p. 49) that there were found 305 nests on a space of three to four acres, and this is probably no exaggeration if the place is the same one as I saw near the Myvatn farm-house. I found numbers of Scaup and shot about twenty on the Fishivatn lakes in Central Iceland. These were all immature non-breeding birds, which goes to prove that in the breeding season the nesting and non-nesting birds keep somewhat apart. At Myvatn I saw no Scaups except those that were adult and breeding. Many Scaups, however, breed south of these lakes, Mr. Jourdain having found single pairs at Thingvella and other lakes in South Iceland.

Norway.—Breeds in numbers in East Finnmark, and in small numbers in the Fjeld lakes from Throndhjem to Christiania Amt. I have seen Scaups that had evidently bred in many lakes in Stavanger, Bergen, and Throndhjem Amts, and also in the lakes of Dovrefjeld, where they are said to be fairly numerous.

Sweden.—On the Fjeld lakes of Lapland and Jemtland, and also on the coast of Stockholm and Gotland, and on islets of Ronehaum, and east and south coasts of Ölan (Westerlund).

Russia.—North-West Finland (61°25 to 70°); in Novgorod and possibly in Petersburg Government (S. A. Buturlin); had bred in the Island of Oesel, Russian Baltic Provinces (*Orn. Monatsber.*, 1910, p. 5).

Germany.—Said to have bred at the Hildersee, Brunswick (Blasius); in Anhalt (Baldamus), and occasionally in the Mark and Mecklenberg (Naumann); Bornholm (A. Grunack, *Orn. Centralblatt*, 1879, p. 59).

Austro-Hungary.—Said to have bred in Bohemia since 1892.

Asia: Siberia.—Breeds in large numbers on the Tundra of North Siberia from Archangel far to the east. On the Kolyma up to 67° N. (Buturlin); also in Kamtschatka and the Commander Isles. These Asiatic Scaup frequenting the two last-named places have been separated recently under the name of *F. mariloides* (Vig).

But it is somewhat doubtful if they can be regarded even as a sub-specific race. They differ only in size, some being as large and practically identical with true *N. marila*, whilst others are smaller and more akin to *N. marila affinis*, the small nearctic race. Naumann suggests that these eastern Asiatic birds may be merely hybrids between true *N. marila* and *N. marila affinis*, and since a proportion of the latter probably and

occasionally migrate south and west from Alaska and meet the Asiatic birds on the coasts of China and Japan, the suggestion is a good one.

North America.—The American form of the Scaup differs very slightly from the European bird, and the general tendency amongst writers is to unite the two. It breeds in the interior of Labrador, Lake Winnipegosis (Manitoba), Alaska, British Columbia (east of the coast range), Alberta, Saskatchewan, Yukon delta, and Magdalen Isles in the Gulf of St. Lawrence (Macoun, *Cat. of Canadian Birds*, 2nd ed., i. p. 94). It also breeds in Dakota and probably throughout the greater part of the Arctic prairies from Labrador to Alaska.

MIGRATION RANGE.

Europe: British Isles.—On migration Scaup seem to arrive first in the Orkneys and Shetlands. I have often seen parties of young birds early in September, and have shot them in the last week in August on Loch Stenness (Orkney), though these may have been home-bred birds. Late in September the number slowly increase in these islands, but few are seen on the east coast of Scotland until the middle of October, after which date the parties form in large packs in suitable places. Scaup are abundant on the east coast of Scotland in the winter months, especially in the estuaries of the Little Ferry, Dornoch Firth, Moray Firth, the Aberdeenshire coast, and in suitable places all the way to the estuaries of the Tay and the Eden. South of St. Andrews Bay they are not common, and I have only seen small numbers about Leith, Musselburgh, and North Berwick.

On the west coast of Scotland they are far less common, and although regular visitors to Mull, Iona (Graham), and the west side of all the islands in the Sound of Harris, they are nowhere to be seen in large numbers. A good many frequent the estuary of the Clyde and coasts of the south-western counties of Scotland.

In England it is abundant on the coasts of Northumberland and Durham, especially in hard winters, and also very numerous on the Yorkshire and Lincolnshire coasts. Coming further south it becomes scarcer owing to the absence of suitable feeding grounds, though it is fairly common on the Norfolk coast, and even in a few places on the south coast of England it occurs in small numbers. On the west coast of England it is a regular visitor, whilst in Wales it is fairly common about Barmouth and a few winter in the Dovey estuary, common on the Dee estuary, numerous off the Point of Air, and occasional on many other spots (H. E. Forrest, *The Fauna of N. Wales*, p. 289). On the west coast of Lancashire and Cumberland it again becomes more numerous.

Generally speaking the Scaup is common in winter on the north and west coasts of Ireland, and scarce on the south except in severe seasons. It is very abundant on Belfast Lough and Lough Swilly. Sir R. Payne Gallwey mentions the bays of Kerry, the Shannon estuary, the Galway coast and Dundalk Bay as favourite localities. It is only irregular on the east coast, though I have seen some numbers in Dublin Bay, at the mouth of the Liffey, and on the coast about Balbriggan.

In winter it ranges to the Mediterranean (scarce in west); also Black and Caspian Seas. Records: Gibraltar Bay (Irby, p. 229); Corsica (J. Whitehead, *Ibis*, p. 85); Italy (especially Venetia and Lake Garda); Sardinia, Sicily, and Malta (Arrigoni, *Manuale*, p. 745); Herzegovina (*Orn. Jahrb.*, 1895, p. 259); very doubtful whether it has occurred in Greece (Reiser, *Orns. Balcanica*, III.); Macedonia (Elwes and Buckley, *Ibis*, 1870, 340); Lower

Egypt (Von Heuglin, *Orn. N. O. Afrikas*, Shelley, p. 290); Algeria (Locke, cf. *Birds of Tunisia*, p. 216); a pair said to have been seen in Abyssinia (Von Heuglin).

Asia.—Palestine coast (H. B. Tristram, *Faun. and Pl. Palestine*, p. 117); Arabia Petrea (v. Heuglin, *tom. cit.*); Asia Minor (*J. F. O.*, 1908, p. 620); Caspian (Blanford, *E. Persia*, II. p. 302), also (*J. F. O.*, 1910, p. 479); India, rare, but has occurred in Kashmir, Nepal, and in the plains of N. India as well as at Bombay (Hume and Oates, vol. iv. p. 462); China, Chinese and Formosan coasts (*P. Z. S.*, 1871, p. 419), Quantung coast (*Ibis*, 1904, p. 278), Foochow and Swatow (*Ibis*, 1892, p. 492), Fokien (*J. F. O.*, 1910, p. 479), &c.; Korea (*Ibis*, 1892, p. 245); Japan (Seebohm, *Birds of the Japanese Empire*, p. 256), &c.; Tsu-Shima Islands (*Ibis*, 1892, p. 400). The Scaup found in winter in China, Japan, and Korea probably belong to the sub-specific race, *Nyroca marila nariloides*. That is to say, if the reader regards those birds as different from *N. marila*.

North America.—On the east coast of America the nearctic Scaup migrates south in October, and winters in large numbers from Maine to Florida and the West Indies and Mexico. On the Pacific Coast I have seen immense flights of Scaup at the mouth of Stikine (Alaska) in October, but most of these birds move on in November to the coast of British Columbia, where large numbers are always to be found between Vancouver Island and the mainland. It is common in winter from Vancouver south to the coast of California. It is scarce on migration in Nova Scotia and Newfoundland.

Dresser states that it is rare in Greenland, but several American authors regard that country as one of its homes in summer. Mr. Schiöler gives several instances of its occurrence in Greenland, of which he kindly sends me details. In America the true Scaup is generally known as the *Greater Broadbill*, or *Blue Bill*, to distinguish it from the Lesser Scaup (*Fuligula affinis*, Eyton) or *Lesser Broadbill*, a closely allied but smaller sub-species, which is also abundant in the New World. H. Seebohm (*Birds of the Japanese Empire*, p. 256, and *History of British Birds*, p. 579) regards all these forms of the Scaup as identical.

HABITS.—Whilst the foregoing species are essentially ducks of the brackish water or open freshwater lakes, the Scaup Duck is one that makes its home in autumn, winter, and early spring on saltwater estuaries or the open sea. In all respects it is a hardy species, capable of resisting cold and the stormy waters of the northern seas.

They have no special love for rough places, but where frequently shot at on the coast, they will ride out quite a heavy sea under the shelter of some projecting headland, and will remain for hours on the lip of a heavy "jabble" in places that a small boat would find some difficulty in sailing with safety. This is particularly the case in an off-shore breeze. In the Tay estuary, where Scaup are very plentiful in winter, I have often seen two or three hundred Scaup lying off-shore in very rough weather, only awaiting the hour of low water, when they can swim in to the mussel-beds to dive or search ashore for their favourite food. In very rough weather they pack in large numbers, and one day I well remember, after several days' gale on the "Lucky Scaup," a mud mussel-bank on the Fife shore, there must have been nearly a thousand Scaup assembled on the feeding grounds.

This circumpolar duck, whose breeding range extends over the whole of the Arctic regions of the New and the Old Worlds from 70° north latitude to 55° north latitude, move

south from the breeding places to the open sea, where they assemble in large numbers. Only a few remain near their summer homes, where there may be permanent open water, such as the south coast of Iceland and the Faroes, and they appear to prefer the fringe of the ice region, such as the north coasts of Britain and Germany, to the sheltered seas and freshwater lakes of Southern Europe and North Africa. It is not correct to speak of them as strictly sea ducks, for, on migration in autumn, numbers of Scaup (generally immatures) find their way to all the large sheets of fresh water in the centre of Britain and Germany, whilst large areas of brackish water, such as Loch Stenness in Orkney, which contain *mollusca* may be resorted to by them for the whole winter. Yet, except in summer, it is rare to find Scaup in any numbers on fresh water, and if disturbed they have no hesitation in leaving such ponds or lakes as they may have casually chosen. During gales large numbers of Scaup will sometimes leave the sea and resort for a few days to inland lakes in the immediate vicinity of the coast, and every winter one may see considerable parties of Scaup on sheets of water such as the lochs of Strathbeg, Spynie, and the lochs of the Outer Hebrides, in Scotland. In fact even in fine weather they will come into these sheltered havens to drink, preen, and bathe, returning to the sea at night to feed.

Their true home in winter may be said to be quiet gulfs and bays on the sea itself, or broad estuaries just at the mouth, where large mussel-banks are disclosed or easily reached at low tide. Unlike surface-feeding ducks, whose condition is greatly affected by a continued spell of frost, Scaup Ducks are capable of withstanding a great degree of cold, and remain in good condition however severe the winter, since their food is always obtainable as long as the bays in which they live are not frozen over. In the severe winter of 1894-95 I killed numbers of surface-feeding ducks that were little better than skeletons, whilst the Scaup that I obtained in the northern firths were quite as fat as usual. It is only when they remain too long on freshwater lakes, as they sometimes do in Germany, and get caught by the first severe frosts that drive them to slow-running rivers of fresh water, that Scaup are affected by severe conditions.

Naumann thus speaks of the habit of Scaup of moving to freshwater lakes in the vicinity of the coasts being frequent :—

“On many coasts, such as those of Pommern and others of the Baltic, where these duck are wont to assemble in enormous flocks, they sometimes remove their place of sojourn of their own accord now to one place, now to another, and in this way return again to the first, and their migration hither and thither, especially in spring when the mating instinct is aroused, seems quite endless. Flights like these change, too, in the evening from the sea to large inland lakes situate near, and indeed, as usual, not in solitary sections, but in a single uninterrupted flock, stretching to an interminable length, which, strange to say, always follows the same course, as though a defined high road led through the air. The comparatively small number which visit these land lakes also in autumn, know nothing of these night and morning changes and remain at night on these same large basins of water, and seldom visit surrounding small pools.”

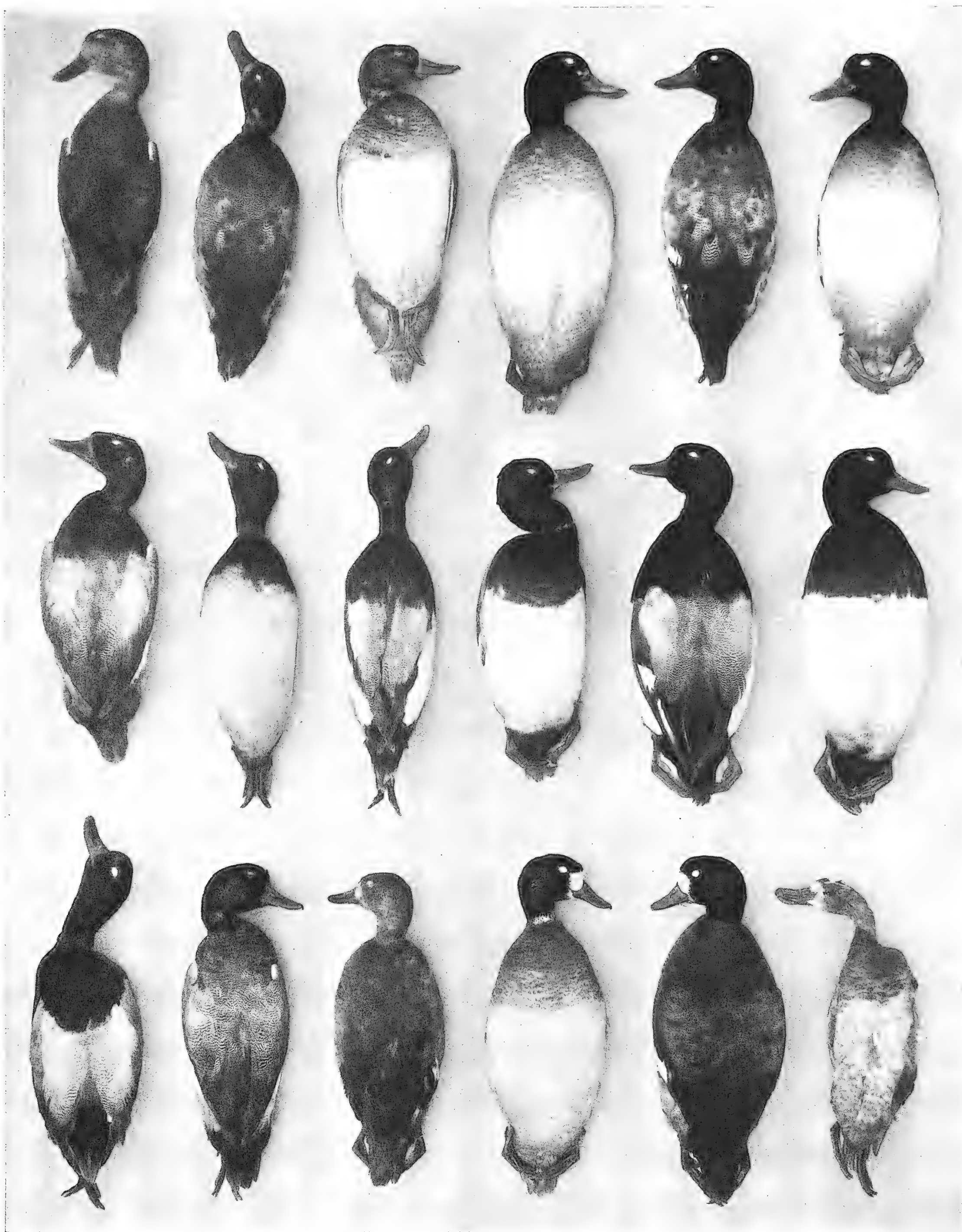
Although by no means a very shy bird or one presenting any great difficulties to the gunner, the Scaup Duck nevertheless exercises a considerable degree of caution in the choice of its position by day. On large lakes Scaup generally keep in the most open places farthest from the shore, only swimming in to the feeding grounds at stated hours. On the estuaries they prefer shallows off the mussel-banks which are themselves the termination of land surrounded by great flats, where the approach of human beings can

easily be observed. In fact in most of the favourite resorts of Scaup in Scotland known to me it is impossible to stalk the birds from the shore, owing to the dangerous character of the slime and mud near to the sea. Scaup seem to know this, custom having taught them that men are never concealed nor can they approach them in such places, and dive about and among the beds, and even go ashore to rest and feed upon them without fear.

I have often heard it said, even by experienced wild-fowlers, that Scaup always obtain their food by diving, but I had positive proof one bitter winter day in 1890 that this rule is not invariable. I had crept up to the edge of the bent grass on the Fife shore of Tents Muir, and had used my glass for some time, when I found a few Scaup swimming in the narrow channels. Resting on the ooze and mussels were a few more. The tide had nearly ebbed to the full and I was wondering whether it would be possible to approach the birds by stalking as the ground was, as I knew from experience, capable of bearing me, when a roar of wings announced the arrival of one of the largest flights of Scaup I have ever seen. They came in from the sea in one great glistening battalion, followed by a few smaller parties. After swinging once over the birds in the small channels they circled round, and I expected them to drop on the edge of the main tideway some eighty yards further out. But much to my astonishment they swung in again, and alighted with great noise and very abruptly amongst the small pools and shallow rills scarcely capable of floating them. The birds had probably been moved more than once from their feeding grounds, for they all at once commenced to feed with avidity. More than half the flock went ashore and waddled amongst the mud and mussels, devouring the food with the greed of farmyard ducks, whilst numbers fed on the edge of the rapidly flowing streams in much the same fashion as the surface-feeders. I had never seen Scaup act like this before, nor did I do so again. As the tide kept retreating the Scaup followed it, as if afraid of being left too far from their natural element, but the greater part of the flock continued to feed ashore for fully half an hour. Then, doubtless feeling nervous, they rose in one body and settled on the sea edge where it was impossible to reach them, so I obtained no shot.

At a distance the males can easily be mistaken for the females of the Tufted Duck, but when in flocks or even singly the male Scaup is easily distinguished by his shining white back. In fact in watching a flock of Scaup the constant movement of the old males gives a curious shimmering or twinkling look to it. On land their movements are very similar to the Tufted Duck, the walk being clumsy or rolling.

Scaup are great divers, and as they affect places where their food is usually obtained at depths ranging from six to twenty feet, they will not remain for more than a minute beneath the surface. When feeding on common mussels the food is usually so abundant in certain spots that they do not require to travel much to obtain it. Consequently they will sometimes remain for an hour in one place, covering only a small area, without moving, and diving assiduously all the time. They seem to be very careless in the matter of posting sentries, and their suspicions are not easily aroused. All the flock may disappear at once and then all come to the surface, or part may come up and part be busy below, so that there is no fixed method or care shown, wherefore it is easy to approach them in a small sailing-boat, and easier still in a gunning-punt. I have on more than one



PLUMAGES OF THE SCAUP DUCK.

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| 1. Immature male. River Eden, Fife, N.B. Oct. 1890. Age, 3 months. Backward bird. | 2. Immature male. Patshull, Staffordshire. Oct. 25th, 1906. Age, 3 months and 25 days. | 3. Immature male. Loch Flemington, Nairn, N.B. Sept. 30th, 1890. Age, 3 months. | 4. Immature male. River Eden, Fife, N.B. Jan. 9th, 1889. Age, 6 months and 9 days. |
| 5. Immature male. Inverness Bay, N.B. Dec. 1890. Age, 5 months. | 6. Immature male. River Eden, Fife, N.B. Feb. 1st, 1890. Age, 7 months. | 7. Immature male. Inverness Bay, N.B. Jan. 30th, 1890. Age, 7 months. | 8. Immature male. Hickling Broad, Norfolk. May 13th, 1903. Age, 10 months and 13 days. |
| 9. Immature male. Hickling Broad, Norfolk. May 13th, 1903. Age, 10 months and 13 days. | 10. Adult male. Ely, Cambs. March 1st, 1884. Winter plumage. | 11. Adult male. Inverness Bay, N.B. Jan. 1st, 1891. Winter plumage. | 12. Adult male, Inverness Bay, N.B. March 1st. Breeding dress. |
| 13. Adult male. Lyosvatn, Iceland. June 1st, 1891. Breeding dress. | 14. Adult male. Loch Flemington, Nairn, N.B. Sept. 1st, 1890. Full eclipse. | 15. Immature female. River Eden, Fife, N.B. Jan. 3rd, 1890. Age, 6 months and 3 days. | 16. Adult female. Inverness Bay, N.B. Jan. 10th, 1892. Winter plumage. |
| 17. Adult female. Inverness Bay, N.B. Jan. 10th, 1892. Winter plumage. | 18. Adult female. Myvatn, Iceland. June 20th, 1891. Full breeding dress. | | |

occasion allowed my punt to drift right into the very middle of small flocks of Scaup that were diving for food in the Eden estuary, and have had the birds come up alongside the boat within two or three yards before they seemed to realise that there was anything to fear.

The actual powers of swimming of the Scaup are very considerable. They will swim for a long time in a rough sea which would cause other species to rise at once, and wounded birds will face heavy water with far greater courage and success than any of the Pochards. The fast stroke is very powerful, and I have noticed that tame Scaup in a pond can swim from one end to the other at greater speed than any other duck, except the Long-tailed Duck. Possibly the Velvet Scoter is faster than any duck in the water when moving at full speed, but I have had no opportunities of testing these birds in confinement. Sportsmen, too, have many opportunities of observing the skill and endurance of the Scaup, for slightly winged birds are always far more difficult to kill, that is to say, if they are not snapped immediately after or before their *first* dive, than Pochards or Tufted Ducks. I found by experience that if a flock of Scaup are fired at with the big gun, and there are three or four winged birds, it is essential to pole to seaward of them at once and force them to dive towards the shallows, when they only make short dives and are usually bagged, whereas if they once get up wind into the open sea or lake they are very difficult to recover, as they make long dives and only show just the top of the head and bill in rough water.

In flight they proceed at a rapid pace in a somewhat compact formation. The birds fly very close together, and the sound produced by their wings is somewhat loud and rustling. On rising to fly the neck is straightened out, and the bird runs along the surface of the water with considerable splashing for a few yards, but the distance travelled on the surface of the water is coincidental with the amount of head wind. In calm weather, if not much disturbed, they are always liable to take to wing, and if the boat does not press them they will swim away for a long time before turning round and facing up wind. When sitting on the sea Scaup often keep in one long unbroken line parallel to the coast, and when rising the first bird at one end takes wing and is followed in order right across the flock. When flying they keep at a moderate elevation, but if the wind is off shore and they are desirous of coming in to some estuary, they nearly always strike the sands or part of the coast line which they desire to cross at exactly the same spot every day and at a considerable height. As they approach the waters of the estuary and feeding grounds, the leading birds then often make a dive downwards, their movements being followed in line by the rest of the flock, so that if the line of birds is a long one it often has a curious *waving* appearance. Doubtless this rising high as they approach the coast line is dictated by common sense, for it is on the sands and rocky shore that they are most often shot at, and they learn caution from bitter experience. When on migration by day I have seen Scaup circling at a great height, but when leaving the sea or open water for the feeding grounds at night Scaup as a rule do not fly much above thirty feet above the land or water. I have, when waiting for duck on the mussel beds at dawn and sunset, occasionally obtained shots at flight at Scaup, and the sound of their rushing wings has often foretold their approach, when, if they could be seen in time, I have occasionally made successful shots. When in small parties Scaup may sometimes be seen flying in oblique formation

like other ducks, but when in large companies they generally hold together in a solid phalanx, or in one long unbroken line massed in several places.

By nature Scaup are somewhat unsuspicious and very gregarious. In their winter homes they keep strictly apart, and are not found associating with other species. Even single birds on migration will keep apart from other ducks, although they may temporarily find themselves in their company.

At other seasons, except the breeding time, Scaup are very silent birds, their only call, generally uttered by the female, being a deep "Karr-karr-karr." A wounded male will also utter the same note.

In the winter months Scaup feed little on vegetable food, unless they are regularly frequenting freshwater lakes. On the sea I have never seen them touch the soft roots of *Zostera marina*, so dearly loved by the Wigeon and Brent Geese, although they eat the seeds freely. Even in summer they only live partly on the ripe and unripe seeds of floating or submerged water plants, for in the contents of the stomachs of Scaup at this season are always found quantities of water insects and small fish. Their principal food is small shell-fish of all kinds. On the Baltic they seem to live exclusively on small single-shelled animals (*Littorina littorea*). Thompson (*Birds of Ireland*, iii. p. 139) found in the contents of their stomachs single-shelled mussels such as *Littorina littorea*, *Littorina retusa*, *lacuna quadrifasciata*, *rissa ulvæ*, *cerithium reticulatum*, and *nassa maculata*, also pieces of the bivalve *nucula margaritacea*, the remains of crustacea and the seeds of *Zostera marina*. I have noticed that in very cold weather Scaup seem to prefer to frequent estuaries rather than the open sea, where food seems more difficult to obtain at such times. In Iceland, during the breeding season, Scaup eat quantities of flies of various kinds, young trout, and the small freshwater snails, as well as the succulent growths of several water plants I could not determine.

The majority of Scaup that have wintered in Britain leave us early in March, before pairing commences. Various authors have thought it necessary to record the fact that they have seen individual Scaup in Germany and Britain in the summer months, but any field naturalist who has travelled much in the summer in Scotland and the northern islands is certain to see one or more Scaup frequenting lakes that have been their winter home, and I have seen many Scaup in summer, both in Orkney and Shetland, in the months of May, June, and July. In some cases these birds were paired, but more often they were single. It is no unusual thing to find a single or pair of any sea diving ducks "out of season," and I have a note to the effect that I have shot a Velvet Scoter in Orkney in every month of the year.

Faber and Thienemann have stated that Scaup arrive in March on the southern coast of Iceland, and that they work north gradually to the freshwater streams and lakes of Myvatn, 250 miles north, in April, and this was confirmed by natives living in Iceland. As soon as they arrive in big flocks on the great Lake of Myvatn, they split up into smaller parties and at once commence their courtship.

The mating show of the male Scaup is not very demonstrative, and is as a rule only commenced by the attentions asked for by the female. In fact it seems that in ducks, as in most birds, the sexual desire is only fairly aroused in the male when some female has made repeated advances so as to arouse his passions. One female being in better condition

than the other shows to the males her sexual desires, and at once all the males crowd round her and display their agility and charm by extravagant attitudes or the exhibition of some prominent feature of beauty. Many males will crowd a female to gain her love, but the prize is neither given freely to the strongest nor the swiftest. More generally she takes a fancy to some particular drake (as described in the *Nat. Hist. of British Surface-feeding Ducks*), and will pursue him to the exclusion of others. After the two are once paired she keeps closely to him alone, and seems to delight in seeing other rivals driven off by her mate.

We must take no notice of the somewhat unnatural associations of ducks in confinement, when one male will sometimes have several wives, or one duck have more than one husband, for although such polygamous and polyandrous marriages do take place in a wild state, they are not the general rule. I have seen both female Pochard and Eider so desperate in their attentions to one male whose love they sought, that they would themselves rush out and drive away other males that came near. Most females are not, however, so singular in their affections, but rather at first seem to enjoy the bustle, fuss, and fighting that takes place on their behalf.

The male Scaup anxious to pair approaches the female with head and neck held up to their fullest extent, the bill being raised in the air to an angle of 50 to 60°. If the female responds to this she also lifts the neck stiffly, at the same time uttering a crooning sort of note like the words "Tuc-tuc-turra-tuc." If alarmed, or pretending to be so, she swims away quickly with powerful strokes, uttering her quacking cry, "Scaar-scaarr." When paired the female often comes up to the male and bows her head gently several times. The actual show of the male is a quick throw up of the head and neck, which is greatly swollen with air as it extends. At the summit of extension the bird utters a gentle cry like the words "Pa-whoo," only uttered once. As he makes this show, the female sometimes swims round him, lowering the head and dipping the bill in the surface of the water and making a gentle call, "Chup-chup," or "Chup-chup-cherr-err." Quite as frequently the cry of the male is uttered after the head is raised and slightly lowered. The male also utters a very low whistle. Except the harsh loud cry of the female, all these calls of pairing Scaup are very low in tone, and the spectator must be within a few yards of the birds to hear them. In consequence the courtship is very difficult to observe in the case of birds in a wild state, and as the birds are seldom seen in perfect health in confinement, the Scaup Spring Show has not been previously recorded. The birds in my picture were drawn from life at Scampston in Yorkshire, on May 1, 1911. I have seen Scaup courting in the Zoological Gardens, Regent's Park, but these did not seem so happy, nor did they display themselves so well as at Scampston.

Mr. Gerald Legge writes to say that the male Scaup in courtship will also suddenly draw back the head and neck with a quick jerk, something like the throw of the male Pochard, but with the difference that the head is always held horizontally, and not turned over with the throat uppermost. He has only seen this once, but the attitude is probably frequently used.

The breeding home of the Scaup lies far to the north in the New and the Old World. In Norway not below 60° north lat., Greenland, Iceland, and the Tundras of Arctic Russia and North America, though it now seems to be showing a greater inclination to extend its

range southward. Writing in a note to me of the discovery of the first nest found in Britain, Mr. Heatley Noble says:—

“I found the nest of the Scaup on an island in Loch Beannach, near Lairg, Sutherland, after watching the old birds for several days. On the loch there were two females and one male, but only one of the former was nesting. I took the nest on June 14th, and found the eggs to be fresh. There has been some doubt cast on the identification of this nest, but no mistake was possible. The three birds were the only ducks on the loch; they were fairly tame, and I watched them every day at close range until I put the female off the nest. She then swam away quite close to me, and was joined by the male. I then lay down in the rushes and watched her go back to the nest. The white face of the female was very distinct, and in addition all the feathers found in the nest were unmistakable. The nest was close to the water's edge, and the number of eggs nine.”

I have not heard any doubts cast on the authenticity of this nest. It is not the least likely that so excellent a field-ornithologist, as Mr. Heatley Noble is, could have been mistaken in his identification of the birds.

I found a very large number of Scaups' nests at Myvatn, Iceland, in the last week in June 1889. For the most part the birds seemed to be very gregarious, after the manner of Eiders, in this favourite nesting-place. I pitched my camp one evening, after a fifty-mile ride from the Skalfandi river, within 100 yards of the Myvatn farm-house, the only one in the district, and found that accidentally I had made my temporary home in the very home of the nesting Scaup. But the birds did not seem to mind in the least, so I was happy for a week observing them and their neighbours, Barrow's Golden-Eyes, Long-tailed Ducks, Mallard, Wigeon, Pintail, a few Teal and Black Scoter, and a host of other interesting fowl, at very close range. All the ducks at Myvatn were remarkably tame, most of all the Barrow's Golden-Eyes, the Long-tailed Ducks, and the Scaup. At this date there were few male Scaup on the little river, on the high banks of which the females were nesting, as it was just the period when love grows cold in duckish affections, and the attractions of “the club,” in the shape of the great Myvatn lake, were superior in the male mind. The Long-tailed Ducks only occasionally made their nests with Scaup, whilst Barrow's Golden-Eye females utilised holes in the banks of the Skalfandi Laxa stream, but many Mallard, and a few Wigeon, Pintail, and Teal nested in amongst the Scaup. In an area of three or four acres near the farm there must have been over 100 Scaup nesting. In many cases two or three nests were placed touching one another, whilst in others two Scaup nests could be seen with a Mallard duck or a Wigeon sitting sandwiched in between. I found other Scaup nests near the lake itself, hidden in the dwarf osier and deep sedge, close to the water; but all the nests near the farm were almost completely in the open, often without any concealment whatever except a little sparse rough grass along the edge. At this date, too, they were all the more prominent by being heaped up round the edge with quantities of down,¹ which with loose feathers could be seen from some distance. All the nests were large and deep in the centre. On the high ground, sometimes 20 and 30 yards from the stream below, the nests were only composed of dried grass and other dry vegetation, the birds not troubling to bring sedge and water plants, but using any material near at hand. I often saw females waddling clumsily up to the nest and settling themselves without fear within a few yards. On leaving the nest they covered the eggs with down

¹ For notes on the down of this species see H. Noble, *British Birds*, ii. p. 38; also *Ootheca wolleyana*.



J. E. Miller
1912

Walter L. Colls, So.

Courtship of the Scaup Duck.

with a few very rapid movements, and then ran a few paces towards the water in a stooping attitude, then raising the head and neck, and taking a good look round, they would appear satisfied, and waddle slowly to the water. On June 30th there were fresh eggs, which we ate daily, and young just hatched. The females led their young to the water almost at once. Messrs. H. J. and C. E. Pearson (*Ibis*, 1895, p. 243) state that the male Scaup in some cases helped the females to lead the young to the water, but I never saw any male come near the female after she had actually hatched her young. I have seen male Shoveller and Teal get quite excited when the female with young, just hatched, was threatened, but in every case the male bird flew right away in a few moments. There were a few male Scaup, doubtless the husbands of sitting hens, on the river below my camp, but they never took the smallest notice of any females with young that came near them.

I find that I only made a few notes as to the nests and eggs of these ducks. Taking twelve nests close to the camp, the average number was 7 to 10. Hantzsch gives the usual number for Iceland as 8 to 11. Nineteen eggs have been found in one nest in Iceland (*Ornithologist*, p. 126), and there is another record of one of 22 eggs in one nest (*Naumannia*, 1857, p. 44).

Riemschneider gives a pleasant picture of the habits of Scaup at the Icelandic breeding places in *Ornith. Monatsschrift*, 1896, p. 309. He says:—

“The males, in their attractively coloured wedding plumage, recognisable from afar, held together in small companies on the surface of the water, keeping a watchful eye on any males which approached, or moved round singly, while endeavouring to approach the females which were not already laid claim to for breeding purposes, with overtures of love. This, however, as a rule did not take place in the stormy way it does with most species, *e.g.* the *hyemalis-Erpeln*, in comparison with which the behaviour of the *Anas marila* is very quiet and restrained. Where a mother-bird was busied over food-getting, whether she had left her eggs only for a short time, or whether it was not yet able to sit, one male also regularly appeared and came up close to the duck meeting him, meantime waiting and keeping very quiet and patient, and only now and then drew the attention of his chosen one to himself by a gentle, low ‘uhu, uhu.’

“The males, too, at this time were not really wild (shy); they could be approached when on a lake by a boat as nearly as twenty paces before they would fly away. In the last days of June they began to exchange the ‘glory’ plumage for the not-at-all showy autumn one, and the approaches to the females ceased more and more at the same time, and the males withdrew almost entirely from the vicinity of the breeding places back on to the open sea again. When I arrived at Skutustadir, on the 20th June, fresh eggs were still being laid. The *Anas marila* were most of them still busy over laying, and collections of fresh eggs were still being made; but the laying of eggs must have begun much earlier, for almost all the nests I saw had their full allowance of down. This lining is, however, begun by the duck when the first egg is laid, and completed during the laying of the next ones, so that it is only the last eggs of the first sitting which are laid on a completely-finished layer of down. If, therefore, an incomplete sitting is found in a finished nest, the nest must previously have been robbed (*lit.*). The first young at the down stage appeared just before I left the Myvatn, that is, at the beginning of July.

“In collecting the eggs, Pastor J., in Skutustadir, always left four or five remaining in every nest of the *Fuligula*; the mother then always hatched out her brood, and would seek out the same place again next year, as he confided to me. In other places they were treated less sparingly, when the mother was left at most three eggs to sit on. The females of the *Fuligula marila* sit on their eggs with the utmost constancy, and only seldom leave them to get a little food, and soon return to them again; these are always covered and kept warm during her absence with the projecting edge of the down lining, so that such a sitting, left temporarily, has the appearance of a longish-oval, plate-shaped hollow in the ground, filled with balls of down. People collecting the eggs do the same thing if they have taken a quantity of eggs from the nest. This covering of the eggs is not performed if she is scared off the nest, and she

allows the disturber of the peace to approach almost to touching distance before, with a rattling noise, but as a rule uttering no cry, she flies away.

"It is a characteristic of this species that, in flying away at such times they always foul the eggs. The scared duck never flies far away from the nest, merely flying to the next pool, and watching from there, with a gentle crackling sound, the proceedings going on at her nest, in order to fly back there as soon as the disturbance is over. Once or twice I was able to observe that the *Anas marila* had laid eggs in a nest of a female of the *Mergus serrator* species. That the reverse was nowhere the case was proved by the down lining of such nests, which could only have been supplied by the Säger (*lit.* Saw bills?). Somewhat larger than the nests of the "saw" duck usually are, it is said that such nests are brooded over by both females in common quite peacefully. The two sittings, even if touching each other in the small space, were still quite separate from each other. I have never been able to detect any robbing of eggs from the next-door nests by the duck breeding here.

"The nest of the *Anas marila* is never found singly, but always in proximity to others of the same species, or in a colony of various species. Under all circumstances—as is the case without exception with all duck—a shallow, plate-shaped hollow is scraped out, and this is provided with a hemispherical lining of abundant, almost black-brown down, interspersed with a good deal of coarse dry grass and stalks, though not as much as the *Anas penelope*. The nest is always so placed that it is somewhat overshadowed by its surroundings, *e.g.* beside the bigger stones, at the bottom of small declivities, in cracks in the ground or of lava and basalt rocks, even at times rather deep down in cavities of the lava. I found nests of *Fuligula* placed like this at a depth of one or two feet, and even as far as the arm can reach. Where the character of the ground did not afford such protection, care is taken that the low-growing birch and osier undergrowth, or tall-growing stalks of weeds, should all help in hiding it. The site of the nest was never more than a few paces away from the water; but at the same time it was only exceptionally that I found any in immediate proximity to the water. In the pouch of down, formed by the lining of the nest, lie the eggs; these have a smooth, slightly shiny shell, of a brownish-grey, rarely greenish-grey colour, at times they have only a washed-out green band; their shape is a rather elongated one, the pointed end of the egg is so blunted that at first sight the two ends might be confused. The egg, in comparison with the size of the bird, has a considerable volume, the measurements (the mean of far more than a hundred eggs measured by me) are: length through, 6.3 cms.; breadth at largest point, 4.3 cms. One solitary egg which I have not counted amongst these has the remarkably small measurements of 4.6 cms. in length; breadth, 3.4 cms. According to Pastor J.'s assertion, this was the last of a sitting. Also as regards the number of the eggs laid by the *Anas marila*, I must give the statement of Pastor J. He says: 'The Dukond lays from nine to eleven eggs, and the removal of some of the eggs in no way increases the production of them; it makes no difference, on the contrary, whether eggs are taken away or not, the number mentioned is never exceeded. Ten was the largest number I found in one nest. When I sought information about the outside limits of their arrival and departure, I learnt that the *Anas marila* had arrived in 1895 between the 1st and 6th May, and the departure took place in August, but my informant considered he could only give the dates of migration approximately in the case of this, as of other species of duck, but he has not imparted any more precise observations to me on the subject.'"

The female Scaup begins to lay at the end of May, and nests with fresh eggs may be found until the first week in July. I noticed that if suddenly scared off the nest the female always flies away, commencing with a run. In doing so, she always fouled the nest with her dung as she departed. The majority of the young are hatched in the middle of July, but I saw several broods in the first week of July. The female incubates the eggs for four weeks (Hantzsch). In all the subsequent rearing of the brood, and the habits of the young, the natural history of the species is similar to the Tufted Duck. I noticed that for the first few days the female Scaup, with newly-hatched young, did not leave the slow-moving stream, running between steep banks, just below our camp. In fact this little river, several hundred yards long before it reaches the big lake,

afforded abundance of food in the shape of black flies, which were here more numerous and more vicious than in any one spot in the world. These flies are, however, sweet to the taste,¹ and much relished by nearly all ducks, young and old. The banks, too, of the stream afforded excellent protection from all cold winds, and some slight protection from the sharp eyes of the ever-marauding Richardson Skuas, which prey on the young of all species.

As soon as the young at Myvatn reach any size, the mother-Scaup leads them down stream to the open lake, and remains there until flocking commences in September, preparatory to the migration. On the Iceland lakes the Scaup obtain most of their food by diving.

Parasitic insects, such as *Docophorus icterodes* and *Trinotum luridum*, are found in the feathers of the Scaup, whilst large numbers of worms infest the intestines, which, according to Von Linstow, embraces the following list: *Taenia leavis*, *Strongylus nodularis*, *Echinorhynchus polymorphus*, *Distomum ovatum*, *Distomum concavum*, *Distomum globulum*, *Distomum echinatum*, *Distomum recurvatum*, *Monostomum attenuatum*, *Monostomum flavum*, *Monostomum alveatum*, *Holostomum erraticum*, *Notocotyle triserialis*, *Taenia megalops*, *Taenia tenuirostris*, *Taenia microsoma*, *Taenia æquabilis*, *Taenia fallax*, *Taenia pigmentata*, *Taenia temerrima*, *Distomum oxyurum*.

On small sheets of water, especially at the time of migration, Scaup are easily shot, but on large areas of fresh water, or on the sea, more difficulty is experienced in getting to close range, owing to the fact that they seldom rest on the water within range of banks, reeds, woods, or rocks. By nature they are not shy, unless constantly harassed, which is seldom the case, owing to their being of little commercial value. On narrow estuaries I have found them very easy to shoot, and have often killed as many as twenty to thirty in a morning on the Eden estuary, by paddling slowly down stream and down wind to them. If not pressed they swim away for a time, and can then generally be "jammed" between the boat and the land, or outlying mussel-bank. If in a large flock, they will generally rise at about eighty yards' distance, but as they have to come up wind and near the punt, they offer a nice raking shot for an 8-bore at fifty yards or so. If in small parties they will remain in the water until the boat is within fifty yards, when a shot may generally be obtained with the ordinary 12-bore. It is seldom worth while firing at these somewhat undesirable fowl with the punt-gun unless specimens for the collection are required, or to furnish food for the crofters or local fishermen, who will eat them without comment, as the loud report of the large gun is sure to disturb all wild-fowl of a more valuable nature within two miles. I only recollect firing my big gun twice in two seasons at Scaup on the Moray, and picked up the first time only six birds (the sea was choppy and the shot a bad one), and twenty-three one morning, in a calm in Inverness Bay. The whole of these birds were adult males and females. During a residence of three years at Fort George, I never saw an immature Scaup except on freshwater lakes or migration. In Orkney, and on the Dornoch and Little Ferry, it was much the same, whilst in the Tay estuary the old and young were about equal. On the Eden estuary and the Forth, by far the greater majority of Scaup

¹ So abundant, and such a pest are these black flies at Myvatn, that in speaking to another person it is impossible to keep them out of the mouth. Children eat them freely, picking them off their faces. Horses stampede owing to their bites, and if tethered are killed by the flies, who eat a hole in the throat at the angle of the jaw.

seen and shot were immatures. Thus we see that in the case of the Scaup, as in all the other diving ducks, there is a defined area frequented by adults and young, and other places resorted to by both. The nature of the locality according to age is always the same year after year.

The flesh of the Scaup is quite eatable in summer, especially in the case of young birds that have not yet been to the sea, but in winter, when they are chiefly shot, it has always seemed to me to be a bird quite unfit for human food. The diet of cockles and mussels gives all diving ducks a rank and even rancid flavour, and a man must indeed have a curious palate that can appreciate such stuff. One authority says that "it can be tempered enough to make its taste bearable" by treating the carcass with vinegar, "smoking" it, and stuffing it with carrots. When I am reduced to eating a Scaup in this fashion my gun will indeed be rusty and the Wigeon and Mallard extinct.

Mr. H. E. Robinson (*Field*) states that he has eaten Scaup shot on Loch Stenness, Orkney, that were "as good as any hand-reared Mallard." Whilst agreeing with that writer that "it is simply a matter of feeding whether Scaup are fit for food or not," I may state that I have shot many Scaup on Loch Stenness in winter and always marvelled how the natives could thank me when I offered them the birds for dinner. I have shot young Scaup on Loch Stenness, just after they arrived in early September, that were quite eatable.

American writers agree that when feeding on vegetable matter and various grasses the Scaup is an excellent bird for the table, but when the food is barnacles and crustacea it is quite uneatable.

In Holland and Germany a few Scaup are caught in loose nets hanging vertically in the water on their feeding grounds. Naumann gives the following account of the method employed in catching them by means of staked nets:—

"They (Scaup) are caught in far greater numbers in places where, in the autumn, they collect in immense flocks in company with other diving duck and spend the winter. One such place which is prominent amongst others is the Kieleer Fjord, where nets are placed for them at their favourite haunts in winter, and where in severe cold thousands are caught, particularly if on account of the ice they have gathered at the mouth of rivers flowing into the sea. These nets are large wide-meshed squares, stretched on stakes, which stand horizontally about 42 cms. below the surface of the water, and the duck get under them in diving, and in rising again can only get the head and neck through the meshes, because they only endeavour to find their way out upwards and do not attempt to withdraw themselves backwards; in this way they are soon choked, and when the nets are drawn up all are found to be drowned."

The Scaup may be kept in confinement with success on the same food as that supplied to the Tufted and Pochard ducks. I have seen specimens in good health at the Zoological Gardens, Woburn, and at Scampston. They do not appear to have bred at any of these places, though there seems no reason why they should not do so. On the Continent they have hybridised with such species as the Red-crested Pochard and the Ferruginous Duck.

There is a beautiful albino Scaup at Tring, in the collection of the Honourable Walter Rothschild. Albinos or white varieties of any of the diving ducks are extremely rare.



Printed by Albert Frisch-Berlin

GOLDEN-EYE
adult male and female

GENUS: *Clangula*

GOLDEN-EYE

Clangula Clangula (Linnæus)

- Anas clangula*, Linn., Syst. Nat., ed. x., i. p. 125 (1758).
Anas glaucium, Briss. Orn., vi. p. 406, pl. 36 (1760).
Anas clangula, Linn., Syst. Nat., i. ed. xii., p. 201 (1766).
Anas glaucion, Linn., tom. cit., p. 201 (1766).
Anas peregrina, S. G., Gmel. Reise durch Russl., ii. p. 183, pl. 16 (1774).
Le Garrot, Buff. Hist. Nat., vis. ix. p. 222 (1783).
Clangula clangula (Linn.), Boie, Isis, 1822, p. 564.
Fuligula clangula (L.), Bp. Syn., p. 393 (1828).
Clangula vulgaris, Flem., Brit. Anim., p. 120 (1828).
Clangula glaucion, C. L. Brehm, Vög. Deutschl., p. 929 (1831).
Bucephala clangula, (L.), Cones, Key N. Amer. B., p. 290 (1872).

LOCAL NAMES.—Golden-Eye, Garrot, Magpie Diver, White-faced Dunbird, Rattle-wing, Rattler, Bell-duck, Bell-ringer, Red-diver, Morillon (old name for females and immatures) (*English*); Whistler, Whistle-wing, Whiffler, Spirit Duck, Bullhead, Plongeur (*Louisiana*) (*English*) (*N. America*); Hwyaaden Lygad Aur (*Welsh*); Garrot (*French*); Quatr occhi, Quattroci (adult male), Companato (young male), Campanele (female) (*Italian*); Schellente, Kobelente, Knobbe (*German*); Brileend, Brilducker, Knob, Bolder, Belder (*Dutch*); Lugen-Vog, Witt-sitted (*Heligoland*); Hvinand, Fiiröine (*Danish*); Hvinand, Skjoerand (*Norwegian*); Knipa (*Swedish*); Sotka, Telkka (*Finnish*); Gogol, gogolsk (*Russian*); Ribarica, Bronzulja (*Bosnian*); Patka batoglavika (*Croatian*); Hohol (*Czechish*); Nihra (*Esthnian*); Hojiro gamo (*Japanese*); Husond (*Icelandic*); Coadgi (*Lappish*); Braimla zeira (*Maltese*); Glavac (*Montenegrin*); Kaczka Krzykliwa (*Polish*); Retor (male), Perdigana d'aigua (female) (*Spanish*); Kerce rucza (*Hungarian*).

There are two forms of this duck inhabiting the colder regions of the northern world, namely, the Golden-Eye of Europe and Asia, and the American Golden-Eye *Clangula clangula americana*. The latter, however, is so nearly identical with the old-world form that past authorities seem to be quite justified in regarding it, as they did, as the same bird. It is merely a matter of opinion whether the two races should be separated or not.

Egg.—In colour the eggs are a bright blue-green, but lose colour considerably after being blown. The usual number is 6 or 8 to 13, but 14, 15, and even 16 eggs have been found in a nest. "Average size of 130 eggs, 59.22 × 42.57 mm. Max. 67 × 39.5 and 60 × 45; min. 52 × 41 and 67 × 39.5" (F. C. R. Jourdain).

Under a hen eggs were hatched in twenty days (F. E. Blaauw, *Ibis*, 1909, p. 188. For a description of the nesting down see *Zoologist*, 1906, p. 373, and *Brit. Birds*, ii. p. 38 (pl. ii. fig. 14). Like that of other species which regularly nest in holes, the down is very light in colour, almost white.

Young in Down.—Crown, sides of the head to the line of the bill, nape, and upper parts, rich dark brown; white spots on each side of the centre of back, sides of the rump above the thighs, and upper sides of the wing; tail and lower neck in front, greyish brown; a brown spot on the chin; under parts, throat, lower cheek, white; thighs, brown; bill,

lead-black with bone-coloured nail; irides, dark grey; front of legs and toes, greenish yellow; webs, dusky black.

Three nestlings hatched by Mr. Blaauw at Gooilust in Holland on June 26, 1908, began to show feathers on the scapulars on July 18th. On August 8th they were completely feathered except for the flight feathers, which were just beginning to grow. At this date the irides were chocolate-brown and the legs and toes yellowish. On August 25th the young birds were able to fly.

Young Male.—In first plumage in September the young male has the head and neck, as far as the hind neck and throat, a dark brown; the fore neck and side of the mantle are grey edged with white; mantle and scapulars brownish black suffused with grey; wing coverts darker, becoming pure black when they join the secondaries, which are white; wings blackish brown, edged with white on the median coverts; secondary coverts white in the centre, with black tips flanked with black feathers; bastard wing and primary coverts and primaries black; lower back and tail-coverts black; tail dark brown with a grey suffusion; flanks brownish grey; breast and belly white, becoming greyish brown on the thighs. Feet and legs similar to adult male, but less bright; bill dull slatey blue. The young male is easily distinguished from the female by its superior size. The bill and legs are much larger, and there is no pale yellow bill-spot. The general colour, too, is much darker.

The young male grows rapidly in size between September and December, and at the age of five months it is generally as large as the adult male. At this time a number of black feathers appear on the cheeks, and the neck collar of white is more or less complete. Individuals, however, vary considerably in December as to the amount of white which now comes in on the lores. In some the white patch is clearly defined, intermixed with brown feathers, in others these white patches hardly show at all (*vide* illustrations). Nearly all specimens at this season show ribbed or mottled scapulars, the blackish brown feathers being either edged with white or marbled, generally the former. The secondary coverts of the wings for the most part have now lost their black spots, though in some cases these are retained until the following July wing moult. The brownish flank feathers are well edged with white or grey.

Rapid changes proceed in the plumage of the young male throughout January, February, and March, owing to the incursion of new feathers. The wings, back, tail, and flanks do not alter, but large numbers of feathers similar to the adult male (or complete in colour) now make their appearance. The white lores patch does not alter much, being still intermixed with dark feathers. The scapulars, however, gain many of the white feathers with outer line of black, and the nape and brown head become almost black, the breast and belly a purer white. So the influx of new plumage continues slowly until May and June, when the white patch on the lores becomes pure white, and the whole bird has an appearance somewhat similar to the adult male, except that the head always remains faded and brown on the crown, and with patches of old brown feathers on the cheeks and chin. The scapulars are only half white, and the wings in the original immature state.

In July the young male commences to pass into eclipse or semi-eclipse plumage, and whilst in this state can scarcely be recognised from the adult male except that the wings are not moulted as soon as those of the adult, nor do they resemble them as yet. In September

the young male begins to assume its first full winter plumage, which it is very slow in getting. Even so late as the following January many young males have not shed the last of their eclipse scapulars, which are still brownish grey, edged with white instead of being pure white, nor is the head usually complete at this stage, being still half full of the old eclipse brownish feathers. Nevertheless many forward young birds are quite complete by January, that is to say, at twenty months. A young male which I wounded and captured in December 1890 lived on a pond at Fort George for two years, and assumed its complete adult plumage at twenty months (from birth). Its passage of plumage was similar to that of wild birds. A gunner on the Tay above Perth wounded in 1889 a young male Golden-Eye in first plumage. This bird made its home beside the island below the Bridgend Bridge, where I observed it with glasses whenever I visited Perth during the three following years, when it disappeared. Its passage of plumage was also similar to those above described, except that it was later in arriving at maturity, not assuming the full dress until April 1891.

Adult Male.—Head and upper neck glossy black, reflecting green and purple lights on the cheeks and crown respectively; the feathers on the top of the head may be said to form a short thick crest; below and in front of the eye is a roundish white patch; lower neck, wing-coverts, breast, abdomen, and under tail-coverts white; flank feathers white with broad lines of black; back and upper tail-coverts black; primaries brownish black; scapulars black and white; tail brownish black. Late in July or early in August the adult male assumes an eclipse, or to speak more correctly a semi-eclipse plumage, the centre scapulars, back, tail-coverts, tail, breast, abdomen, and wings undergo no change, but moult only once, and that directly into full winter plumage. But in August and September the head and neck become brown as in the young male, only remaining black round and in front of the eyes. The white patch below and in front of the eyes more or less disappears, becoming black, sprinkled with a few white feathers. The sides of the lower neck adjoining the mantle become brownish grey; scapulars brownish grey edged with white, like young male; a large number of brownish grey feathers also come into the flanks, which eclipse feathers are again shed in late September. A bird now before me, killed in late September, is moulting all its eclipse feathers on the flanks, but not yet on the head or scapulars.

Adult male Golden-Eyes vary greatly in the rapidity or slowness with which they assume the full winter plumage. I have seen an old male in full plumage in the middle of October, and others which had not attained the full dress by the middle of December.¹ In this they are not so dilatory as the Shoveller or the Garganey, which do not generally assume the full dress until March. Yet they may be said to be slow in comparison with many other species. Beak, bluish black; feet, yellow; webs, dull black; irides, bright golden yellow. Total length, 18 to 20 inches; wing, 8.25 inches; beak, 1.4 inch; tarsus, 1.5 inch; tail, 4.5 inch. Males vary greatly in weight from 2 lb. to 2½ lb.

Immature Female.—Head, as far as the neck, brown; at first the neck bluish grey, with whitish grey or white edgings; sides of the neck, as far as the mantle and shoulders, brownish grey with light edges; scapulars and mantle blackish brown with grey edges to the feathers; back, black; tail, brown; wing-coverts, black; flanks, brownish black with light grey edges; chest and under parts, white; thighs and vent, brownish grey; under tail-

¹ An adult male in the possession of Mr. St. Quintin attained full winter plumage on December 14th, two years in succession.

coverts white, with grey markings; the wings are the distinguishing feature of the immature, and have no white on median coverts, which are grey; secondaries and secondary coverts white, the rest of the wing brownish black. Feet and legs similar to adults, only not so rich in colour; bill, bluish black, with no yellow spot behind the black nail.

The young female alters very little until March, when the white collar on the neck appears. After this the plumage advances very slowly, and only on the upper part of the back, mantle, and chest. The principal character of immaturity, namely the wings, do not change until the full moult, which takes place in late July, August, and early in September. At the end of this month the immature female becomes adult, namely at fifteen months. After gaining the yellow bill-spot in March the immature female loses this mark in June, the bill being a uniform lead blue. The yellow spot is not regained until October. Length, 17 inches; wing, 8 inches; tail, 4.50 inches; tarsus, 1.40 inches.

Adult Female.—The head is a rich umber brown, separated by a collar of white, which is incomplete at the back of the neck, from the grey shoulders; chest grey, edged with white; the mantle and back is blackish brown, edged with glossy grey; scapulars dark brown, edged with white; back, tail, dark brown, turning to black on the sides of the upper tail-coverts; flanks and thighs, dark brown, edged with white; wing-coverts, black; the upper portion of the wings are brown, edged with grey; the median coverts white; lower median coverts blackish brown, with white tips; secondary coverts white, with black ends; secondaries white, with one black and white feather next to the primaries; primaries, dark brown. Total length, $17\frac{3}{4}$ to 18 inches; wing, 8 inches; bill, 1.25 inches, bluish-black, with full yellow spot round the nail; tarso-metarsus, 1 inch; legs and feet yellow, with blackish webs; irides a paler yellow than the male, but bright in spring.

BREEDING RANGE.

British Isles.—There seems to be no particular reason why this species does not breed with us, but it is clear that up to the present the evidence that it has done so is not satisfactory.

England.—A pair are said to have bred on Swinsley Reservoir in 1891, one of the young being captured and the old female placed in the collection of the Leeds Naturalists' Club. It is also said to have bred at Fewston Reservoir in 1895 (*Birds of Yorks*, ii. p. 471 (pl.); *Zool.*, 1895, p. 449). The Hon. Edward Lascelles kindly sends me the following note (Nov. 10, 1911): "I am convinced that Golden-Eyes bred at my father's place, Harewood, Yorks, some years ago (1899 or 1900). My father turned out a number of pinioned Golden-Eye, and all were killed by foxes except one female, which lived there for many years. One season an old male, whom I saw repeatedly throughout the breeding season, came and stayed throughout the summer, and according to our keeper bred with the female. The nest was never found, probably owing to his not searching the trees, but the young were seen with the female, and all were soon destroyed by pike or rats. Personally I think our head keeper's observations are absolutely to be trusted."

Scotland.—A. G. More (*Ibis*, 1865, p. 447) reports, on the authority of W. Dunbar, that a nest was found in a hollow larch on Loch Assynt. Saxby (*Birds of Shetlands*, p. 263) states that he saw a female and four young ones on the Loch of Belmont, and had eggs, supposed to be of this species, brought to him. These records are, however, not accepted as satisfactorily proved by the authors of the *Vert. Fauna of Shetland*. I find in my northern

notes that it is not rare to see adult Golden-Eyes until the end of April, and Mr. W. Berry writes (April 28, 1911) that he has just seen seven adult birds on the Loch of Dochfour, Inverness. Mr. A. H. Evans saw two paired and courting on Loch Maree, May 30, 1891 (cf. *Vert. Fauna of N. W. Highlands*, pp. 241, 239). After May it is sometimes possible to see an occasional Golden-Eye in the summer on Highland lochs. I have notes of observing them as follows: "Loch Stenness (Aug. 12th, four seen, young birds, one shot); Loch Harray (July, three adults seen); Balranald, N. Uist (August 1899, four immatures seen, one shot); Loch Naver, Sutherland (June, two adults seen). In Shetland one or two Golden-Eyes stay every summer. For three years (1895-98) a male Golden-Eye lived on the Tay at Perth, summer and winter, probably a pricked bird. More than one instance of young Golden-Eyes being shot in first fortnight in August on Loch Spynie."

Mr. Gerald Legge saw two adult male Golden-Eyes on Loch Spynie on June 20, 1912.

With reference to Loch Spynie, Captain J. Brander-Dunbar is convinced that Golden-Eyes have bred once on Loch Spynie, but gives no particulars beyond that the young were seen and were probably destroyed by pike. He has known them to stay through the summer more than once.

The nearest regular breeding place to the British Isles is the south of Norway, and there I have seen twice (in Stavanger Amt) adult Golden-Eyes and their young on Sept. 1st, the young being then scarcely capable of migrating. It is therefore somewhat of a puzzle to know where these young Golden-Eyes come from that appear in Scotland in early August, even supposing they migrate the very first day they are capable of flight. Mr. Blaauw's birds were hatched, I think, unusually early (June 26th), and were not able to fly till August 25th.

Iceland.—I saw no specimens of this duck in the north of the island, but on the river Sog in July I came within a few yards of a female with young ones. A pair were seen by H. Slater (June 23, 1885), and skins obtained the following winter (*Zool.*, 1886, p. 1.; *Manual*, p. 62). It probably breeds in small numbers.¹

Norway.—South of the Dovrefjeld it breeds only in alpine and sub-alpine rivers and lakes. Personally I have never seen females and young on the rivers, but only in lakes below the mountains in Bergen and Stavanger Amts. Northward from Trondhjem Amt it breeds on low-lying as well as high lakes and rivers up as far as the limit of conifers in Finmark.

Sweden.—Commonly in Lapland, less so in Tornea Lappmark, and sometimes in Dalarne and Wermland; occasionally also in several localities in Smaland (*Westerlund*, ii. p. 178).

Finland.—Generally wherever trees are found (*Ibid.*).

Russia.—South to lat. 51° N. in the Urals. Locally in the Baltic Provinces (S. A. Buturlin). North to the tree limit.

Germany.—Has apparently nested sporadically in Holstein (Boie), Mecklenburg, Saxony, Pomerania, E. Prussia (*Ibis*, 1892, p. 518), Mark Brandenburg, Silesia (E. Rey).²

Austro-Hungary: Bohemia.—Breeds (E. Rey.)

¹ Mr. E. Schiöler obtained an adult male from Myvatn, killed May 10, 1910.

² Most of these are recorded in the *J. F. O.*

Switzerland.—Said to have bred in the Cantons of Glarus and St. Gall (F. and Studer, *Katal. der Schweiz-Vögel*, p. 55).

Roumania.—R. V. Dombrowski (*Zeit. f. Oologie*, 1904, p. 145) asserts that it breeds in two lakes near Cernavoda, but his statement requires confirmation. (Henke believed that it has bred in the Astrakan district. *Ibis*, 1892, p. 229.)

Asia.—S. A. Buturlin (quoted by Dresser) says it breeds east to Kamtschatka (not in the tundra), but commouly in the west of the Tomsk Government in $52^{\circ} 10'$; also breeds in S. Baikal and Saghalien. Eggs were taken by Seebohm in the Yenesei, lat. $62\frac{1}{2}^{\circ}$, but though it undoubtedly breeds in Eastern Asia, there are no actual records of its nesting, although birds have been obtained.

North America.—To those who accept the American Golden-Eye as a sub-specific race, *C. clangula americana* (Bp.), it is necessary to note that it breeds from Maine to N. Dakota, and thence northward and westward throughout northern British Columbia and Alaska (A. O. U. check list). I suspect that it also breeds freely in Labrador, as I have seen some numbers in the autumn in Newfoundland. It has been obtained once in Greenland (E. Schiöler, *Dansk Ornith. Forenings Tid.*, vol. i., 1906, p. 37); breeds in Maine, New York, Minnesota, N. Dakota, Montana, Alberta, British Columbia, Newfoundland, Labrador, Hudson Bay, Mackenzie Valley, Yukon, and Alaska (*The Waterfowl Family*, p. 144).

MIGRATION RANGE.—Ranges throughout temperate Europe south to the Mediterranean and N. Africa. In the Azores it is rare (*Nov. Zool.*, xii. p. 109), also in Southern Spain (Irby, p. 229); also scarce in Sardinia (*Ibis*, 1873, p. 344); Corsica (*Rep. V. Orn. Congress*, p. 386); according to Locke it is only of casual occurrence in Algeria; Malta, has occurred once (E. Wright); Tunisia, scarce (Whitaker, *B. of Tunisia*, ii. p. 218); Italy, common in Venetia and rare in Calabria and Italy (Arrigoni, *Man*, p. 749); Ionian Isles (Lilford, *Ibis*, 1860, p. 354); Greece (Reiser, *Orn. Bale*, iii. p. 502); Asia Minor (*J. F. O.*, 1908, p. 620); Cyprus, only once (Bucknill, *Ibis*, 1910, p. 402); Black Sea (Alleon, *Hvistoric.*); Caspian Sea (Blanford, *E. Persia*, ii. p. 302, and *J. F. O.*, 1910, p. 72).

Asia.—Winters in Persia from Mesopotamia to the Caspian; India, has been noted in the Indus Valley, once in Oude (Blanford and Oates, iv. p. 465); Burma, Myingyan (Harrington, p. 133); China, once at Foochow, scarce in Fokien, common about Shanghai and south to Amoy (*P. Z. S.*, 1871; *Ibis*, 1892; *J. F. O.*, 1910, &c.); Japan, regular visitor (Seebohm, *B. Jap. Empire*, p. 253); Corea (*Ibis*, 1892, p. 245, &c.).

Has also been recorded on passage from Turkestan, the Tian-Shan, Mongolia, and Ossuria; Bering I. (Commander Isles), *Orn. Expl. Commander Isles*, p. 163.

America.—The American Golden-Eye winters from the Great Lakes and New Brunswick south to Cuba, and is numerous on passage in Newfoundland and along the New England coast. On the west side it winters in large numbers from Vancouver Island south to Lower California and Mexico. I have killed a few of these birds, chiefly females and immatures, in Newfoundland, and was unable to detect any difference between them and European birds. It also winters in Maine, New York, Ohio, Indiana, Michigan, Minnesota, Nebraska, Texas, Utah, Nevada, British Columbia, and the Aleutian Islands, wherever there is open water.

HABITS.—Throughout the summer the Golden-Eye inhabits the northern parts of the

Palæarctic and Nearctic regions, and, generally speaking, not beyond the limits of the growth of conifers. As winter approaches it moves south to more temperate climes, even going to the northern coasts of Africa. It seems to reach the Orkneys, the Shetlands, and the more northerly parts of Scotland first in its migration to these islands, and here occasionally it comes as early as the latter part of August. As the autumn proceeds more and more Golden-Eyes come in, principally, no doubt, from the Scandinavian lakes, where they have bred. Mr. Dresser, speaking of their winter migrations to this country, says "old males are seldom seen," a statement that is quite correct when applied to England and the greater part of Scotland and Ireland, but not quite accurate when applied to certain estuaries in the two last-named. I had been shooting ducks for many years before I found out how locally the ducks of *different ages* were distributed. Up to 1886 I had not killed twenty old male Golden-Eyes, and considered them, comparatively speaking, rare; but a more extended acquaintance with these birds in 1890-92 in the Moray and Beauly Firths, where adults of both sexes are exceeding abundant, caused me to alter my opinion. Except on these two firths, we may say that all the way from Aberdeen round the east coast of England and Scotland to Dorset in the south, Golden-Eyes are fairly common locally, and that about 80 or 90 per cent. are immature birds. The percentage of old males is not exactly small, but they are rarely killed by coast gunners. I have seen many and killed a few old males on both the Tay and the Eden estuaries, where, as usual, the immatures predominate; but south of this the chances of shooting an old male are not good. Along the Welsh coasts Golden-Eyes are common in winter, but here again Mr. Forrest (*Fauna of N. Wales*, p. 289) describes the old males as "curiously rare." As we go north again, Golden-Eyes increase on the Lancashire and Cumberland coasts, and it may seem strange that the only Golden-Eye I have seen in the last-named county were three old males feeding in the river opposite Netherby (December 1911).

In the Solway immatures are common, and so on at intervals northward to the Outer Hebrides, where in winter adults are fairly numerous both in N. Uist, S. Uist, and Benbecula. They are also common on the west coast of Mull, and in all the sea lochs northward to Cape Wrath. In Orkney and Shetland I think that immatures do not outnumber the adults more than four to one, but in no parts of those islands is the Golden-Eye very abundant in winter. By this I mean the winter resident birds, for both in the spring and the autumn migrations I have seen large packs of the birds, over a hundred in number, that were evidently the assemblage of parties going north-east or south. Mr. H. W. Robinson mentions having seen a pack of some hundreds of Golden-Eye (all adults) on Loch Stenness in spring (*Field*), but I have not seen so many in Orkney.

The largest number of Golden-Eye I have seen together was on January 5, 1891, on the Beauly Firth. The weather was severe, and all the Moray Firth Golden-Eye seem to have joined the Beauly Firth birds on this day. As I poled my punt up towards Bunchrew, large parties of Golden-Eye kept making short flights ahead, and not far from Bunchrew I obtained a shot at Wigeon, and at the report of the gun—very loud in these enclosed waters—an immense flight of Golden-Eye, all adults as far as I could see, and numbering quite 1000 birds, passed me going seaward. The noise produced by the wings of this immense flock was remarkable. I do not remember that I either saw or killed a single immature Golden-Eye during the three years I was resident at Fort George, on the Moray

Firth. The first day in 1890 I went after the duck was a stormy one, so I drove to Loch Flemington, and spied four old male Golden-Eye. My groom was an accomplished "mover of ducks," and scared them so successfully that I killed three out of the four as they left the lake. In the evening of the same day I tried an unsuccessful stalk at Wigeon in Campbeltown Bay, and whilst poling home I killed three more old male Golden-Eye. A strange day, it seemed, to shoot as many old males of this duck as I had done in the previous four seasons. After this I seldom fired at Golden-Eyes, though many a good shot at Wigeon they ruined for me.

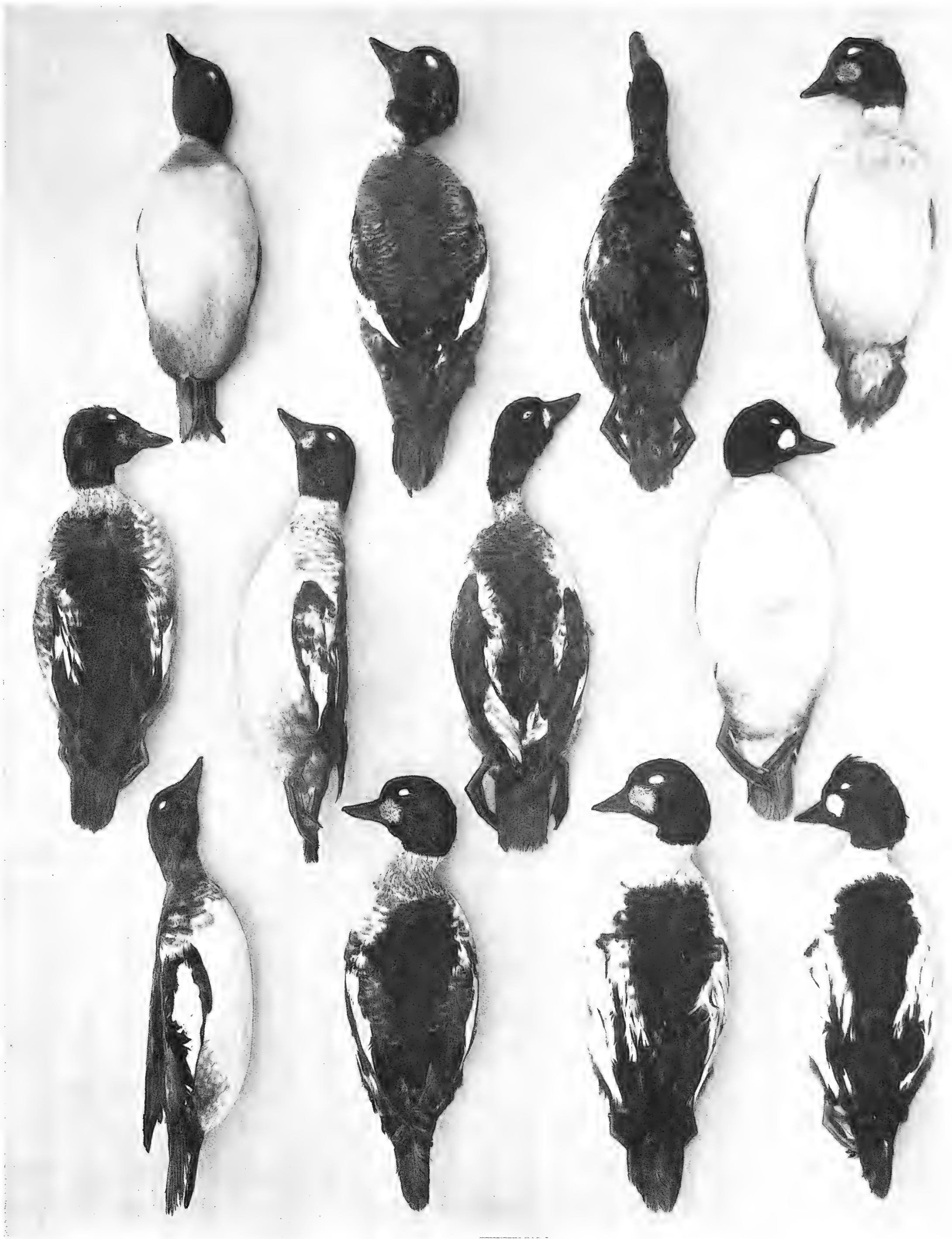
In Ireland the Golden-Eye is common, and very generally distributed on all estuaries and large sheets of inland waters such as Lough Neagh. There they are mostly seen in small parties, and seldom in large flocks, except when about to commence the migration. Thompson speaks of seeing 150 to 200 unmixed with other species, whilst Sir R. Payne Gallwey has seen 200 together without a single old male amongst them. Mr. Williams has informed me that he considers the old males rare in Ireland, as he has seldom had specimens to mount. In Ireland, as in Scotland, Golden-Eye occasionally stay throughout the summer, and have been noticed on Lough Swilly in July (Ussher and Warren, *Birds of Ireland*, p. 209).

The Golden-Eye is not quite so exclusively marine in its habits as the Scaup. Its favourite resorts are brackish or saltwater estuaries, the mouths of large tidal rivers, and large inland lakes. To the latter they come mostly on migration, and visitors to such places are generally single birds or small parties of immatures. These birds seem to have a distinct preference for places where both salt and fresh or brackish water are to be found. They like to rest part of the day or night on one or the other, more generally staying at sea by day or coming in at flight, generally very high, to brackish lagoons or freshwater lakes or estuaries at night to feed. Where such places exist in the British Isles they are always attractive to Golden-Eye, which are somewhat restive and suspicious little ducks, except in certain spots where they are immune from the gunner, and those are rare indeed.

The Golden-Eye certainly suffers somewhat in very severe winters, but even in such winters of great cold as 1881, 1884, 1894-95, I have not noticed that these birds left their regular winter haunts. In 1894 I saw numbers of Golden-Eye in open spaces of water on the Upper Tay, when that river presented the appearance of the Polar regions. They were diving away happily for their food in a temperature below zero, whilst surface-feeding ducks and Pochards sat miserable and starving.

The authors of the *Water-fowl Family* (p. 144) bear testimony that this duck will stand privations that cause other ducks distress. "We associate this sprightly duck with cold weather. The smallest ice-holes, when all the bays and lakes are frozen, give it a chance for a livelihood. The Golden-Eye remains fat and contented under these circumstances, when other members of the duck family quickly show the results of starvation rations." In the New Naumann we are told how Golden-Eye behave on migration and during the severer climatic conditions of the Continent.

"The autumn migration seldom begins before the beginning of November even on the Baltic; at places where they spend the winter in great flocks, it is not often that you see them before the end of the month. Many migrate along the coast of the North Sea and in a south-westerly direction



PLUMAGES OF THE MALE GOLDEN-EYE.

1. Immature male. Heigham Sands. Nov. 8th, 1904. Age, 4 months and 8 days.
2. Immature male. Loch Stennis. Orkneys. Dec. 1st, 1886. Age, 5 months.
3. Immature male. Linnfjorden, Denmark. Oct. 25th, 1903. Age, 3 months and 25 days.
4. Immature male. River Eden, Fife, N.B. Dec. 25th, 1889. Age, 5 months and 25 days.
5. Immature male. River Eden, Fife, N.B. Jan. 10th, 1889. Age, 6 months and 10 days.
6. Immature male. Isefjorden, Salland. Dec. 12th, 1903. Age, 5 months and 12 days.
7. Immature male. Oorapavik, Finmark. June 10th, 1904. Age 11 months and 10 days.
8. Adult male. Winter plumage. Fort George, Nairn. Jan. 1st, 1890.
9. Adult male. Full eclipse. Sibbersund. Sept. 17th, 1908.
10. Immature male; changing from eclipse to full winter plumage. River Eden, Fife. Feb. 2nd, 1889. Age, 18 months and 2 days.
11. Immature male; almost adult. River Eden. Feb. 29th, 1890. Age, 19 months.
12. Adult male. Fort George, Nairn, N.B. Jan. 1890.

till they get to the above-named lands, or press inland in a still more southerly direction to our own country and on still further. They leave our stagnant pieces of water then as soon as ice closes the water to them; they then go either to the larger stretches of flowing water or travel still further south-west. In less severe winters many remain, too, on our rivers and other pieces of open water, and a few isolated birds at all these places attempt, even in the most severe winter, to prolong their life on the few places which remain free from ice on rivers, streams, and even springs. It is extraordinary how such isolated specimens, almost always old males, know how to discover such places within a certain range (approximately a square mile and more); they are clever enough only to visit open places lying near the dwellings of men for the first time late at night or in the evening. In spring, at the first real thaw, the *Fuligula clangula* which have wandered further afield return to our large pieces of standing water, in order to dally here before completely taking their departure for their more northern home, and to be able to await a more settled condition of spring weather, and according as this happens earlier or later—now in March, now in April—they forsake our country, steering their course in a north-easterly direction, except for the few which have apparently meditated choosing to breed in our land. They fly away generally at night, often in large flocks, and they are recognisable from all others, even in the greatest darkness, by the extraordinary ringing sound of their flight, by which, too, the direction of their flight can be observed.”

Broadly speaking the Golden-Eye has a greater love for the sea than for the fresh-water lakes. If we wish to study the bird either from the point of view of the sportsman or the naturalist we must go to some sea estuaries where mussels, cockles, and crustaceæ abound and are found within easy diving reach of the surface of the water. In most of our northern firths Golden-Eye are numerous but hard to observe, owing to their shyness and the difficulty of finding cover to conceal the observer, or the “banks” where they feed at low water are too far out from the shore and situated in places dangerous to man. When they do approach cover, as they do in Campbeltown Bay in the Moray Firth, it is pleasant to lie amongst the sea grass and watch the birds working along the coast in the pursuit of food. Easy, too, it is to shoot them in such places, for these ducks, with all their acuteness of vision, nervous restlessness, and high-flying habits, are singularly dull in leaving no sentries above water when they dive. If you wish to shoot Golden-Eye in such a spot as Campbeltown Bay, it is only necessary to spy them before they see you. Then a sharp run, under cover of the sandhills, brings you opposite their position. The next manoeuvre is to watch the exact length of the dive the birds are making parallel to the coast, and, as soon as all are under water, to make a rush to the sea edge (about 80 to 100 yards away) to the point where you expect them to come up. If your calculations are correct it is your own fault if you do not secure a brace, as the birds will rise to the surface and immediately fly at 30 yards.

At high tide and when not on feed Golden-Eyes are either resting on the open sea, in the centre of an estuary, or flying to and fro. On the whole, I think they fly about more than any of the sea-ducks. Perhaps one notices them more than other species, owing to the singing noise of their wings as they rise or pass by, but they always seemed to me the most restless of all sea-ducks except perhaps the Long-tail in spring. They are not fond of associating with other species, but may often be seen feeding on the edge of large packs of Wigeon and other ducks and in places where shooting goes on, never failing to rise noisily at a distance of 100 to 300 yards, to give their less observant friends warning of the approaching danger. The nose of a punt, even if covered with seaweed and propelled by hidden hands ever so slowly, is nearly always detected by the sharp-eyed

Golden-Eye, and it has often puzzled me to know how accurately they have diagnosed the distance when other species were frankly unconscious of approaching danger. Those little golden eyes are very sharp ones. Even when lying hidden in banks the gunner is lucky if that small party of Golden-Eyes does not observe him, and shoot heavenward before he can rise to his feet.

When frequenting freshwater lakes they like deep open places, and do not seem to mind if they have muddy or sandy bottoms, but unless the sheet of water is very large and the supply of shell-fish abundant, I have not known Golden-Eyes remain for any length of time on fresh water. They will sometimes stay for months on flowing rivers, and I have known them frequent the Tay and the Isla and other rivers for a whole winter if these do not become blocked with ice. This is also the case in the Eden in Cumberland, the Aln in Northumberland, and other rivers too numerous to mention.

The bright black and white colours of the adult male render the species easy to distinguish at a great distance, whilst immatures and females are also easily recognised on the water by the curious equilateral-triangle shape of the head, the depth they swim in the water, and the broad trail they leave behind in swimming. Easy, too, are they to recognise as soon as they rise, by the "singing" noise produced by their quickly beating wings. The large amount of black and white on the wings, and the gleaming white breast and collar are also distinguishing features in flight, but even at very close range these parts are not noticeable when the birds are swimming. During the period of their stay with us a Golden-Eye rarely if ever goes ashore, and even in their summer homes I have never seen one on land, although it is possible they may come ashore occasionally. Females walk on to their nests. Even in confinement they rarely come off the water, and there sit with the head very much drawn up, and walk in the usual heavy rolling fashion. When swimming they usually sit very low on the water, with head well sunk between the shoulders and tail trailing in the water. If observant of danger at a distance and about to rise, the neck is straightened and the head held up high, with the crest somewhat raised. But if anxious to escape observation without resorting to flight, they swim away rapidly with the head held forward, almost on a level with the water, and the body "sunk" so that the tail is out of sight.

In resting hours they float much higher than when feeding, and are fond of rolling over on their backs as Scaup often do to preen the breast feathers, and at such times the large amount of black and white on the males can be noticed at a great distance.

Golden-Eyes are the most expert of divers, and often employ the dive in preference to swimming directly to some spot, for they know that by this means they will arrive more quickly. I have often seen my Golden-Eyes at the other end of a pond when I have gone to feed them and other ducks, and they were generally first to the food, because they dived and came past the others, which were swimming on the surface.

In clear water it is easy to note the powerful strokes of the legs of these ducks, which seem to beat with great rapidity under water and much power. The stroke is more or less parallel to the wings, the head is held out straight in front. I have watched for hours the male Golden-Eye that lived for three years on the island below Perth bridge, and used to find his food at the bottom of the river in some 8 to 10 feet of water. In summer this water was as clear as crystal, and from the bridge above the observer could note every movement

on the part of the bird. It always proceeded to a depth of 8 to 10 feet of water, and began to dive. On reaching the bottom, it at once commenced to turn the stones over with the bill, and from under these, various water-insects were found or caught as they attempted to escape. Sometimes it would find a small batch of young freshwater mussels, and these it would devour very quickly one after the other, like a duck taking grain out of a pan. It never stayed under water more than a minute even when finding food abundant in one spot, but came up, rested a moment or two on the surface, and dived again. All food was swallowed where it was found, and small pebbles and fairly large stones were pushed over in the search. Several times I saw the bird just move a flat stone. It would go all round it and try it from every point. If unsuccessful it would come to the surface and rest awhile, and then go down again for another effort. In a lake the Golden-Eye will dive in perpendicular position, but in flowing water it dives in a slant against the stream or tideway. Their bodies are very light, and bounce up to the surface like a cork immediately they cease to push downwards with the feet. In still water the Golden-Eye often dives in circles to get to the bottom.

Their food consists principally of salt and fresh water mussels, water-snails, species of crabs, fish, frogs, tadpoles, and water-insects of many kinds. They are also said to eat the roots and seeds of certain water-plants, but of this I have neither seen nor heard of direct proof. On the sea I have only found the remains of crabs, mussels, and other shell-fish mixed with quantities of coarse sand and small stones. In a small pond they will soon catch all the small fish, if no species of *Mergus* are kept there.

In the sea I have watched them diving in water that must have been 18 to 20 feet in depth, but I should doubt if they are able to stay under water at a greater depth, that is to say, if there is any tideway. In confinement they can be "fed-off" on to bread-crumbs and grain, which, with such natural food as they may obtain on a pond, will suffice to keep them in health for some time, but this somewhat unnatural diet always tells against them in the course of a few years, and this is probably the reason why so few live for any length of time in confinement, or show a desire to pair. When fed on "crissel" and other mealy products, with a regular supply of fish, &c., they always thrive better and live longer.

Their flight at first starting is somewhat clumsy. They rise after a short run along the water, but once in the air they proceed with much speed and buoyancy. When flying over water they move at a normal height, but when going long journeys or passing over land, they get up to considerable elevation, especially in still weather. If on feed, they are somewhat unwilling to fly and swim away fast, but if in some place where they know gunners are about they rise freely, and generally far out of shot. The flight is accompanied by a pleasant "singing" or "ringing" sound, that can be heard at a considerable distance on a clear day or night, and is produced by the manner in which the front primaries are held and beaten in flight.

No ducks are more bold in the "headers" they will take from the clouds when pursued by a raptorial bird. I was collecting birds one day in February 1882 on Loch Leven, the Inverness-shire sea loch, when I heard the sound of Golden-Eye, accompanied by a peculiar hum of something passing through the air. On looking up I was just in time to see the interesting spectacle of a Peregrine making a stoop at three Golden-Eyes. The ducks

at this moment were high, I should say 80 yards in the air, and closed their wings as they heard or saw the Peregrine coming, and dropped as if shot to the surface of the water. On striking the water there was no pause, they just passed out of sight, rising nearly 100 yards away, and flying low over the water. The Peregrine, after its unsuccessful "stoop," did not pursue them. Like the Long-tailed Duck, but scarcely with the same skill in starting, the Golden-Eye has the power of opening its wings immediately on reaching the surface of the water, and commencing to fly. I have seen other ducks act in a similar manner when chased by Peregrines, but none displayed such promptitude or fell from such a height as did these Golden-Eyes.

No diving ducks are more swift to take alarm than Golden-Eyes, or more ready to communicate their fears to other ducks that may be feeding near at hand. Not only is their eyesight especially keen, but Naumann says "they fly from a skiff or boat, and over a portable screen of reeds, or a shooter's shelter if they can *scent* the marksman in it, for they have an unusually keen scent, which may be accounted for by the unusual size of their nostrils." There may be something in this, since the recent evidence of some of our best field-naturalists has gone far to prove that both ducks and geese are able to apprehend the presence of man by the scent, and to be warned thereby.

On the other hand, Golden-Eyes show their natural intelligence by appreciating protection more quickly than most species, for there are many instances of wild birds of this species becoming remarkably tame, and accustomed to the sight of human beings, in lakes and streams where they were unmolested. In Dresden, wild Golden-Eyes may be observed throughout the winter, in a pond situated near a promenade, where hundreds of people daily pass.

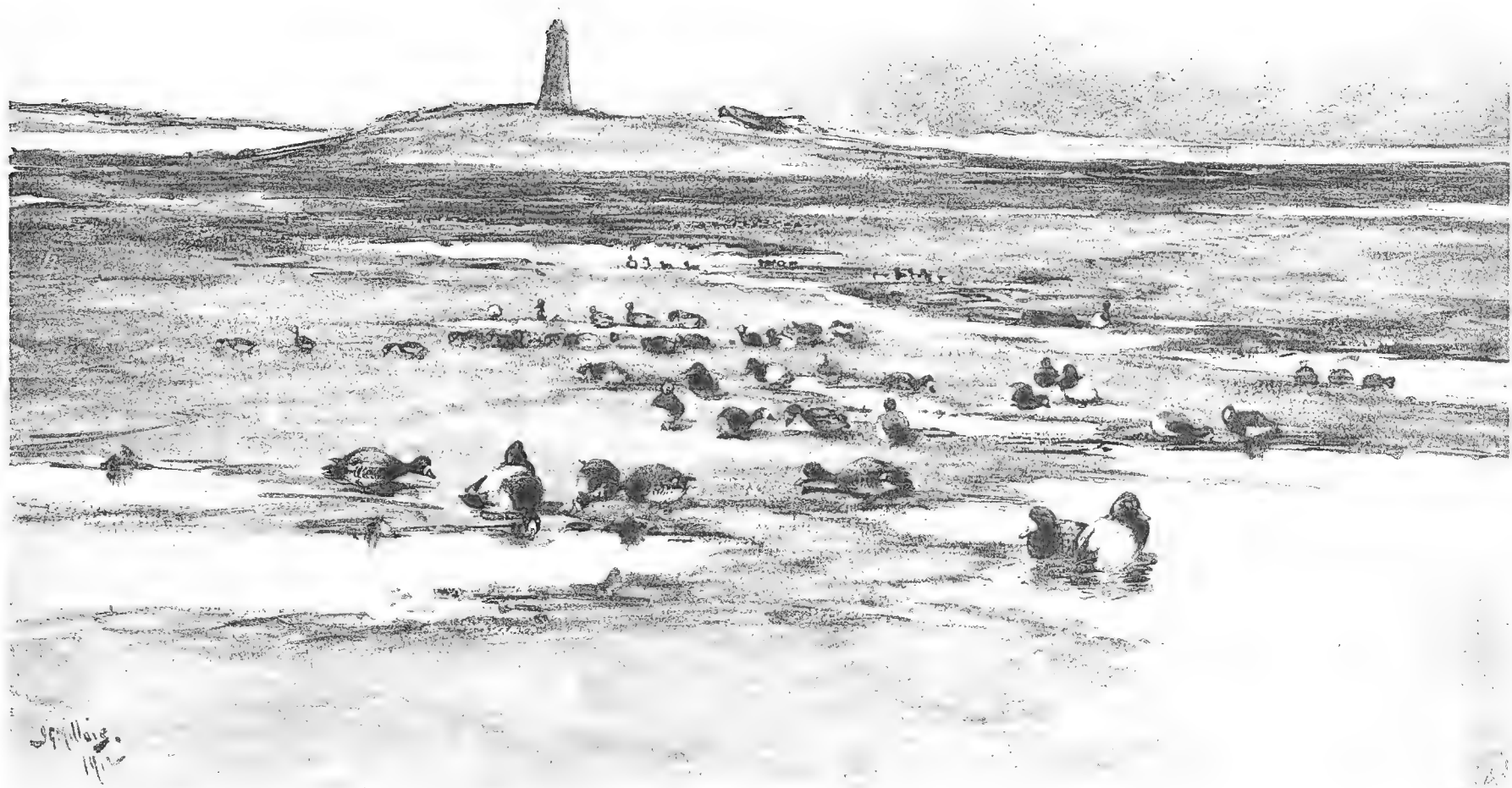
Both sexes make use of a hoarse "Kraa-aa" as a call, the male being somewhat louder than the female. This is usually uttered when quarrelling or frightened, but it also acts as a warning cry. In the courting season the male makes it more frequently, "Kraa-kraa-kraa-kraa" sometimes repeated many times. I have heard the female make a low note like "Wah-wah" when talking to her young. On the whole they are remarkably silent birds.

In late March and early April Golden-Eyes assemble in large flocks and leave our islands. In some cases the birds pair before they depart. One day in March I spied a large flock of adult Golden-Eyes on the Loch of Harray, Orkney, which were all engaged in courtship, and the splashes and rushes of the males were clearly visible, although I was at a considerable distance. Something alarmed the birds, so that I was unable to get nearer to them, and two days later they had all gone, except one pair which, according to my gillie, remained for some weeks.

The courtship of the Golden-Eye is a very attractive one, and may be described in detail, as I have read no account of it in standard works.

The male approaches the female with his head and neck held stiffly up at an angle of from 60 to 75°, the feathers on the cheeks being much puffed out. He swims, sometimes with raised tail, in a semicircle round her, gradually elevating the bill until it is quite perpendicular.

The third action is to drop the head, still more puffed out, suddenly between the shoulders, the bill still pointing heavenwards, and to kick once alternately with both feet so as to throw a jet of water high in the air behind the bird. At the moment of throwing back



GOLDEN-EYE AND SCAUP COMING IN TO FEED. EDEN RIVER, FIFE.
 SCAUP ON FEED ASHORE.

the head the call "Keek-kee" is emitted, but sometimes it is given after the kick. During this show the female is either lying low on the water with neck depressed, or she is advancing towards her mate with head and neck outstretched, and somewhat similar in attitude to that of the male. Beyond this I have not seen the female make any show, but she also has a distinct form of responsive courtship, and for this discovery I am indebted to Mr. Gerald Legge, who writes as follows (April 4, 1912):—

"The female Golden-Eye has a very noticeable courtship as well as the male. She sinks her breast low in the water, which gives the impression of cocking up the tail, but I have satisfied myself that she does not do so. At the same time she suddenly throws up her head and neck until the bill is quite perpendicular, and at the same time she makes a loud call, quite unpronounceable, and quite distinct from that uttered by the male. She also kicks with both of her feet, but does not kick the water so high as the male. I have seen the old female I have here courting every evening, and have noticed that the kick is done with both feet, one after the other, in quick succession. The Golden-Eyes that I have here are two adult males and two adult females, and one immature female. The adults are paired, and the immature female never loses an opportunity of worrying the old ducks. It is usually after the young bird has chased her elders that I see what I have described. The drake approaches his duck and does his full show and kick, and the duck seems to follow in imitation. I have, however, several times seen the old duck show when she has not been pursued by the young bird. The noise she makes is beyond my powers of description. It is very loud and harsh."

Another curious thing the male Golden-Eye does, after pairing with the female, is to make a mad rush along the surface of the water for 15 or 20 yards. Whilst doing this he adopts the somewhat remarkable attitude I have endeavoured to represent in the lower figure of the courtship sketches. The breast is held high out of the water, and head depressed backward with bill up in the air. He makes the water fly in all directions, and not infrequently makes his rush at any other duck that may happen to be near. Altogether the courtship of the Golden-Eye is a very striking one, and the idea of casting into the air a spray of water, often lit by iridescent colours, is a beautiful one; but the more we study this interesting subject of love amongst the birds, the more we are struck by the fact that they have a very distinct notion of beauty in its highest sense. In nearly every case where the males are of remarkable beauty the spring display is a notable one, and each part of the plumage is shown to the female with the evident intention of appealing to her sense of beauty. The Birds of Paradise, the Pheasants, Peacocks, Ruffs, &c., all birds of remarkable adornments, make gorgeous revelations of their personal beauty, and do not omit the exhibition of any part that is attractive; and so through all the genera of birds, even down to those possessing small personal attractions, which call in other forms of nature to help them, such as the building of courting arbours decked every morning with flowers, and the presentation of flowers and shells, &c., to their inamorata. One of the most touching examples of love I have ever seen was one day at the Zoo, when I saw a male Satin-Bower bird pick the only daisy in his pen in the western aviary and hold it for twenty minutes (by my watch) in the face of the female, who also remained quite stationary, and fully appreciated his proffered gift.

On reaching the breeding grounds Golden-Eyes pair at once, or arrive in pairs, and soon become very tame. Any hole not too large in the exit, of varying height, seems to suit them for a nesting-site, and in their northern homes it is usually situated in an old fir. In north-eastern Scandinavia they make general use of the nesting-boxes put up for

them by the peasants, and these are frequented by breeding females even when in the close proximity of human habitations, or villages. In Germany, where this species has bred, it has made its nest very scantily put together in reeds, and this carelessness of architecture is probably due to its want of practice in nest-making and the absence of suitable holes. In that country, too, it has been found in willow swamps. In Iceland, where a few pairs breed, they must lay their eggs in holes in the steep banks of rivers, as the Icelandic Golden-Eye does, or in cavities in the lava rocks. In Pomerania the nest has been found in the holes made by the Black Woodpecker in trees close to lakes, and in other places from Holstein to the Baltic (Naumann). Both this species, as well as the Mandarin and Wood Duck of North America, can squeeze into the holes made by large Woodpeckers, and seem to show a preference for small entrances to their nesting sites.¹ W. Bar describes (*Ornith. Monatsschr.*, p. 250, 1891) five nests found in hollow oaks in the neighbourhood of Forsthauses, Haidehaus, near Danlik, whilst in some districts of the Baltic Golden-Eyes are known as "Birch" ducks, owing to their fondness for nesting in these trees. Mr. H. E. Dresser says (*Birds of Europe*, p. 600):—

"In the north of Finland, in Sweden, and in Norway, it nests in hollow trees, either near to or at some distance from the water, and very frequently in the nest-boxes which the peasants hang up for the water-fowl to breed in, and which are called by the Swedes 'Holkar,' and by the Finns 'Pöntto.' These are frequently hung up close to the peasants' huts; and even there the Golden-Eye will nest in them. The bottom of the hollow tree or nest-box is neatly lined by the old bird with down; and on this soft bed the eggs, which vary in number from 10 or 12 to 17, or even 19, are deposited."

Seebohm, in describing the nesting-places in Siberia, says:—

"But the most remarkable thing in the history of *Fuligula clangula* is that they sometimes sit on the bare branches of a tree in a wood, and if they have discovered a hole in the trunk (or branch), even if it be quite a narrow one, perhaps merely leading to an inner chamber, will lay an egg in it on the perished wood without any nest at all—just like a Woodpecker. These nesting-places are often at a considerable height above the ground. In the valley of the Petschora I have seen one which was at least 7.6 ms. above ground, and one in the valley of the Yenisei about half that height."

W. Brewster, in describing a breeding place of the American Golden-Eye (*Auk*, 1900, p. 207), says the eggs are laid at the bottom of a hollow on the dried chips of wood, and that down is only added below the eggs and round them when the full complement has been laid. Sometimes the eggs, which are the same as those of the European bird in size, colour, and number, are packed in two layers on the top of each other.

The usual number of eggs is from 8 to 12, but there are several instances of 16 and 17, and even of 19 eggs being laid. In Norway, where the nest is regularly robbed, one egg is always left in, and with this inducement the female will go on laying for a long time, until, it is said by the peasants, she will lay as many as 30 or 40 eggs.

First eggs are often laid as early as the end of April, but fresh ones may still be found until late in June. Mr. Blaauw tells us that the period of incubation is only twenty days (Naumann says twenty-two days); a remarkably short one. Seebohm, Dresser, Naumann, and a host of writers who have followed them, state that "the young birds are carried by the female in her beak down to the ground or to the water, one after another being taken down until the entire brood is taken in safety from the elevated nesting-place; and I have

¹ It is well to remember this in making convenient nesting-boxes for these three species.

been assured by the peasants that this always takes place in the dead of the night" (Dresser, p. 600). I have also heard the same story from the peasants both in Scandinavia and in Iceland, and always doubted it after seeing a nest of young wild duck descend from a high broken elm. In fact, I think that the whole thing is nothing but a "saga" or tale which has been handed down from one generation to another. Moreover, in addition to the foregoing instance, when I saw the whole of the brood fall out of the nest some 20 feet from the ground and run uninjured to the mother who called them, I had the good fortune to witness the following incident on July 3rd at Myvatn. I had been stalking some Pintail drakes in eclipse, and came to the edge of the high bank overlooking the Skalfandi river about two miles from Myvatn. There was nothing in sight except a female Icelandic Golden-Eye, who seemed to be in a frantic state of excitement in the water below me, not 15 yards away. I wished to get away, as the flies were unendurable on that day, but stopped to look at the bird, and wondered where her brood was. She was evidently not frightened of myself, but kept swimming up and down uttering her oft-repeated "Krâ-krâ." She would not go away, however, but kept for the most part opposite to me, occasionally striking the water with her wings as if attempting to fly. I sat for some moments watching her, and was about to leave, thinking that a Skua had killed her young, when I observed a small black-and-white spot on the edge of a hole on the farther bank. Presently it disappeared, and its place was again taken by two similar objects. A moment afterwards I saw the head and neck of a baby Golden-Eye peering over the edge of the hole. Immediately another chick seemed to leap upon its head in less time than it takes to tell it. Eight little Golden-Eyes literally "poured" out of the nesting-hole one after the other, and fell in the water close to the mother. The distance these nestlings fell would be only about 10 feet, but I have not the slightest doubt that if the distance had been 30 feet the chicks would not have been injured.

Immediately her brood had descended the mother swam away with them. I followed them for a short distance, and at the second shot killed one of the young ones with my small catapult, as I wanted the specimen which appears in the coloured plate of this volume. I have not the least doubt that young Golden-Eye always descend from the nest in the manner I have described, and that the idea of the mother carrying them down is merely a fairy tale.

Since the above note was written, many years ago, I have found a note by Brewster, who also witnessed the exit of young Golden-Eyes from the nest. He also describes their appearance as "pouring" out. He says:—

"At 6.45 o'clock the old duck appeared at the entrance of the nest, sat there for five minutes, turning her head ceaselessly from one side to another and searching her whole field of vision; then she withdrew again inside and reappeared after a minute to look round again as before for five minutes. At the end of this second period of watching she flew to the water and swam three times round the stump, clucking and calling. When she had gone round for the third time, she stopped just under the hole and uttered one loud cry or cluck, upon which the chicks scrambled to the entrance and fell so quickly one after the other into the water that they almost sprang on top of each other. They poured out of the nest like water out of one's hand. One or two hesitated for a moment when they reached the opening of the nest, but most swung themselves over the edge as soon as they appeared. All agitated their little wings quite freely and beat them in plunging down. They did not seem to swim strongly.

"Whilst this was going on the old hen sat motionless on the water and looked up at the nest.

When the last chick came down she immediately swam at the head of her brood in the direction of some reeds close to, in which they vanished."

Like other females of the genus, the Golden-Eye surrounds her eggs with down, and if she leaves the nest covers the eggs with it. During the latter part of incubation she sits very close, and will allow the nesting hole or box to be struck by a stick without causing her to move. During incubation the male only visits the female somewhat casually when she goes to feed in the evening, and after the young are hatched he goes off with other males and deserts her altogether.

I noticed the young catching quantities of insects on the surface, and do not think that they dive much in the first few days of life. I also have seen female Golden-Eyes take food from the bottom and break it up for the young, and even in their early stages these birds have a preference for animal food, for on the rivers where most of the young are reared there are no water plants to speak of. In a very few days young Golden-Eyes dive for their own food, and their up-growth is similar to other species of diving ducks. In Norway they seem to leave the rivers after a time and work their way to the higher lakes by the end of August, keeping well to the centre of wide open stretches of water, where the family may be seen in little dark clusters.

In the feathers of this species may be found a parasitic insect, *docophorus icterodes* and *d. chrysophthalmus*, common in other ducks, and *trinotum luridum*, and in the intestines many of the worms of the genus *echinorhynchus*, *tænia*, *strongylus*, &c.

On rivers and small sheets of water Golden-Eye are not difficult to shoot, although they are amongst the toughest of the small ducks and must be hit well forward. Unless repeatedly fired at they usually come over the gunner fairly high, but well within shot of a full-choked 12-bore, and it is only necessary on lakes to find their *breaking-out* point, and on narrow rivers some spot where one may lie hidden to successfully drive this duck and obtain a fair chance. I have killed some numbers of this duck in Highland rivers by merely sending one driver some miles up stream away from the river and causing him to walk down along the bank. Golden-Eye can be seen or heard approaching from some distance, and it is merely necessary to hide on the bank to obtain a shot, as the birds carefully follow every turn of the river as they fly down stream. On large sheets of water and estuaries it is more difficult to shoot Golden-Eyes, but I have been very successful in killing these birds on the Eden estuary by following the main channel down stream at low water and waiting under the shelter of some low mussel-bank, where I knew the birds were in the habit of crossing as they came in from the sea to feed. Most of the males figured I shot in this way, and could have killed large numbers had I wished to do so, but as their flesh is of no value from a culinary point of view, I never killed more than what I required for specimens for myself and other collectors. It is rare, indeed, to obtain a shot at passing Golden-Eye on the open sea, but in the Moray and Beaully Firths I had often shot them from the punt as I came homewards by getting them between the boat and the weed-strewn shore, over which they always seem disinclined to fly.

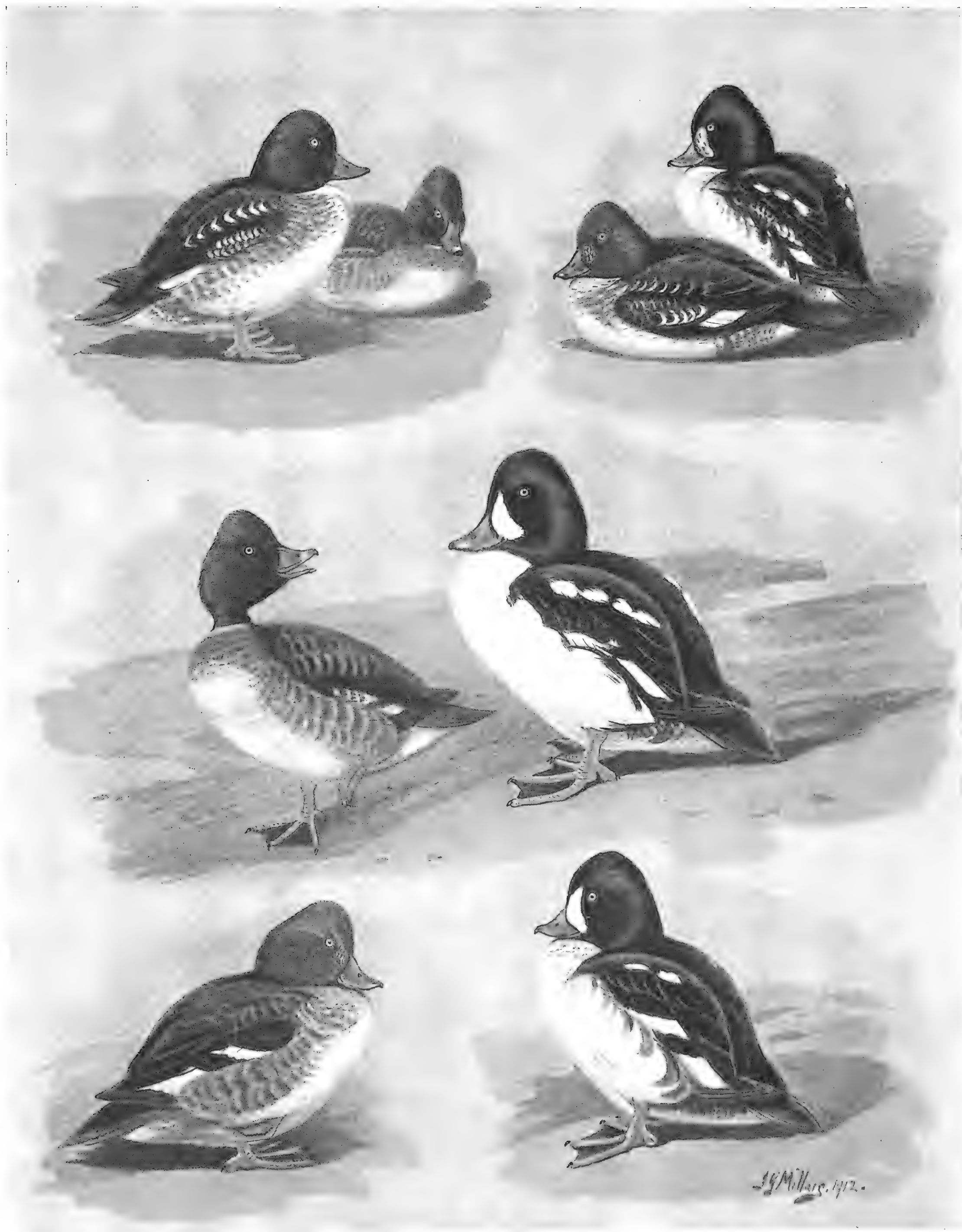
A winged Golden-Eye is a difficult bird to recover, for unless the water is very calm it is hard to see it as it rises and again dives. They soon vanish if there is the slightest ripple, and if falling amongst rocks and weeds will stay out of sight with remarkable skill. Many gunners have assured me that this bird when wounded will hold on fast with its bill



Golden-Eyes Courtship
Scampston, Yorks.
May 1st 1911.
J. Millies

Walter L. Colls, So.

Courtship attitudes of the Golden-Eye.



PLUMAGES OF BARROW'S GOLDEN-EYE.

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| 1. Immature male. Naubrtalik, Greenland. Nov. 11th, 1908. Age, 5 months & 11 days. | 2. Immature female. Husavik, Iceland. Oct. 1st, 1910. Age, 4 months. | 3. Immature male. Jukkertoppen, Greenland. Apr. 13th, 1902. Age, 9 months and 13 days. | 4. Immature male. Myvatn, Iceland. July 5th, 1910. Age, 12 months and 5 days. |
| 5. Adult female. Iceland. Nov., 1910. | 6. Adult male. Iceland. Nov., 1910. | | |
| 7. Adult male; eclipse. Myvatn, Iceland. Sept. 28th, 1910. | 8. Adult male, passing from eclipse to winter plumage. Husavik, Iceland. Oct. 4th, 1909. | | |

to the roots of weeds and die in this position ; but this, I think, is somewhat of an exaggeration. I have often seen wounded Golden-Eye literally bury themselves in seaweed and tangle, and have, when I have so noticed them, lain by in the punt overhead to see what they would do. Such is their tenacity that they could stay in one place until they died of their wounds or were drowned ; but I never saw one try to hold on with its bill, and if found with mouth closing on the weeds, it was so owing to the fact that in its dying moments the reeds held the bird fast and it gripped them in its mouth. More generally, if only winged, the bird will remain in its position of safety for a minute to a minute and a half, and then sneak to the surface beside some seaweed, and just put its bill up and go down again, or lie hidden under the fronds.

On the Continent a few Golden-Eye are caught by the horizontal net set at sea, but more are captured in the north of Germany and in Holland by the following method : A small hut is built in the rocks or embankment of some large lake in a place where the water is shallow. Over an extent in front of the hut the operator stretches the two large nets under water at no great depth, and other nets of equal size which can be worked by lines from the hut are set ready to be drawn. A few stuffed Golden-Eye fixed on posts at the water-line act as decoys, and the birds on the lake being moved they soon see the decoys and settle amongst them, when all ducks within the net area are easily captured.

I have shot most of the diving ducks to decoys, and have found that they only came at all freely to painted models or stuffed birds of their own species, but I have not tried shooting Golden-Eye to decoys. On the eastern coast of North America a few are shot to decoys, but they do not come to them very freely. The usual winter method of shooting them in the New World is by means of an ice-boat rigged on a sledge and pulled out to the edge of the ice. Sportsmen who have shot the birds by this method tell me they are very wary and often only stoop from the sky and rest a moment before they discover the hidden shooter and are off again.

Golden-Eyes are somewhat mischievous on fish-ponds, and will destroy large quantities of young trout and other small fish.

There is a remarkable hybrid between this species and the Smew *Mergus albellus* in the ducal Natural History Museum, Brunswick. It is an adult male, and was killed in the spring of 1825 on the river Oker, near Brunswick. The bird resembles both species, and was at one time thought to be a distinct species. Four other hybrids between these two species are known, and for long the cross was known as *Mergus anatarius*. The second specimen, a female, was killed on February 8, 1829, on a small pond near Reuthendorf.¹ The third was caught in the Isefjord, N.E. Seeland, in 1851. The fourth was shot on November 20, 1881, in Kalmarskud, and is now in the Museum of Upsala. The fifth was shot in the vicinity of Poel in Mecklenburg, and is now in the collection of Oscar Wolschke.

So far this hybrid has not occurred in Britain. I think that the Golden-Eye would mate with Barrow's Golden-Eye, and it seems somewhat strange that no such hybrid is known. Only males, however, would be easy to identify.

¹ This specimen is no longer in the "Brehm" collection now at Tring (Hartert).

BARROW'S GOLDEN-EYE

Clangula islandica (Gmelin)

- Anas clangula*, Briss. Orn., vi. p. 416, pl. xxxvii. fig. 2 (1760).
Iceland Duck, Lath. Synops., iii. p. 545, No. 83 (1785).
Anas islandica, Gmel., Syst. Nat., i. p. 541 (1788, ex. Lath.).
Fuligula islandica, Steph., Gen. Zool., xii. 2, p. 192 (1824).
Clangula barrovii (Swains.), Faun. Bor. Am., ii. p. 456 (1831).
Clangula scapularis, C. L. Brehm, Vög. Deutschl., p. 932 (1831).
Fuligula barrovii (Swains.), Nutt. Orn., U.S. and Canada, ii. p. 444 (1834).
Platypus barrovii (Sw.), Reinh. (Senior), K. Dansk, Selsk. Naturrid. Afh., 1838, p. 103.
Anas barrovii (Swains.), Temm. Man. d'Orn., iv. p. 551 (1840).
Glaucion islandicum (Gm.), Keys. and Blas. Wisbelth, Eur., lxxxvi. p. 229 (1840).
Clangula islandica (Gm.), Bp. Cat. Met. Ucc. Eur., p. 74 (1842). Dresser, &c.
Bucephala islandica (Gm.), Baird, B. of N. Amer., p. 796 (1858).
Glaucionetta islandica (Gm.), Stejn., Proc. U.S. Nat. Mus., viii. p. 409 (1885).

LOCAL NAMES.—Barrow's Golden-Eye, Icelandic Golden-Eye, Barrow's Duck, Iceland Duck, Rocky Mountain Golden-Eye or Garrot (N. America) (*English*); Islandsk Hvinand (*Danish*); Islannin telkka (*Finnish*); Garrot islandais (*French*); Niakostok, Kaertlutorpiarsuk, Analortalik, Avolortalik (*Greenlandic*); Barrow's Dykand (*Dutch*); Husond (*Icelandic*); Islandsknipa, Barrow's Knipa (*Swedish*); Spatel-ente (*German*).

Egg.—10 to 14 in number (Hantzsch) and occasionally 15; the shape is a rather short oval with the shell strong, fine grained, not very shiny, and smooth; colour, greyish pea-green or blue-green. In two nests found by myself at Myvatn, June 1889, were 9 and 10 eggs respectively. Three females with 10, 10, 12 young were also noted. In America, Brooks records 14 young brought off from one nest.¹ Mr. F. C. R. Jourdain informs me that the average size in mm. of 66 eggs is 61.33×44.47 mm.; the maximum 68×43.7 and 61×47, and the minimum 58×45 and 61×43.5. Average weight of 28 eggs 7.33 gr. (6.36 to 7.98), Dr. Rey. Incubation by female alone extending to a period of four weeks (Hantzsch). The young fly in five to six weeks. Down very similar to that of the Golden-Eye, but somewhat paler (Dresser). Whitish-grey in bulk, but single sprays appear to be white (F. C. R. Jourdain).

The small flank feathers are pure white. Dresser says that in one nest of each species of Golden-Eye he examined, the flank feathers of *C. islandica* were smaller.

Pennant (*Arctic Zoology*, vol. ii. p. 574, 1784) gives no Latin name to this species, although he describes the male Hrafn-ond, Olaffen, Iceland, "with a crested head, black above; under side of the neck, breast, and belly white; legs, saffron-coloured. Inhabits Iceland. Whether a variety of the former? for the Icelanders style that species Hrafnus-aund." Pennant may therefore be said to have first described the species, although Gmelin is responsible for the Latin name.

Young in Down.—There is very little difference between the young in down of Barrow's Golden-Eye and the Golden-Eye except in the colour of the feet and the size and shape

¹ The instances in which 23 and 24 eggs have been found in one nest are directly due to two ducks laying together.

of the bill. At birth the two species seem to be very much the same size, but the bill of Barrow's Golden-Eye thicker and stronger; the feet also are of greyish-green colour with grey-black webs, whilst those of the Common Golden-Eye are yellowish with grey-black webs. Further description is unnecessary, as Mr. Grönvold's picture illustrates both species correctly.

Immature Female.—Head and upper neck, brown; mantle, scapulars, and sides of the chest, brown, with grey edges; wing-coverts, black, with slight purple sheen; flanks, dark brown with grey edgings; upper chest, brown, edged with greyish-white; thighs, brown; under parts, white; tail, back, and primaries, brownish-black; wing similar to immature female Golden-Eye. Eye and legs similar to adult female, only less decided in colour. Iris, olive-yellow to greenish-yellow. The immature female Barrow's Golden-Eye can always be distinguished from the Golden-Eye by its superior size, larger crest on the head, and richer markings. In February or March a moult commences in which the white neck-collar is attained, and the plumage afterwards undergoes the course of plumage of the female Golden-Eye, attaining maturity and full plumage in October, that is to say, at fifteen months.

Adult Female.—The colour of the head and upper neck of the adult female Barrow's Golden-Eye varies considerably. In some individuals, probably those who have just reached maturity, it is a rich dark brown; in others it is blackish brown with a lighter tint on the front of the crown; the crest is much longer and more abundant than that of the Common Golden-Eye, and it has a slight purplish tint. The lower neck has a pure white collar; mantle and chest, brown with light grey edges; scapulars, blackish brown with light grey edges; wing-coverts, primaries, back, and tail almost black; flanks, brownish grey with white edgings; thighs, brown; under parts, white; a few dark feathers about the vent and tail-coverts; central secondary feathers, white, with outer ones black; secondary coverts, black on upper half, white below, striped with black; upper parts of the wing, smoky-black, edged with white. Feet and legs, yellow, with black webs; irides, yellow, inclined to straw colour in spring. Bill: as in the Common Golden-Eye, there is a rich yellow mark behind the nail, but the extent of this varies greatly in individuals. In most examples it is small and only extends as far as the front of the nostril; in others it passes half-way up the bill below the nostril, the rest of the bill is bluish-black. On the lower mandible the yellow space extends over the greater part behind the black nail. As some confusion may take place between the female of this species and the Golden-Eye, I give the average measurements of both species.

	Barrow's Golden-Eye.		Golden-Eye.	
	Female. Inches.		Female. Inches.	
Total length	19		18	
Wing	9		8	
Beak	1.25		1.3	
Tarso-metatarsus	1.5		1.3	

The characters of the female Barrow's Golden-Eye, apart from superior size, are the black back and tail, blackish head and longer crest, and general difference of a more intensified black and white. The yellow bill-spot is also more extensive.

Mr. Allan Brooks informs me that according to his experience the iris of the adult

female is "yellowish with an inner ring of bluish, giving an appearance of green." The bill, he says, "is usually black with the terminal third orange-ochre, including the nail. Sometimes the entire bill is orange, though this is very rare; females with a dull orange bill with the base dusky brownish-olive are more common." From notes on soft parts of certain females from Greenland I am able to corroborate this statement, and possess a female whose bill, although faded, can have had no dark markings in life.

Immature Male.—In first plumage in October the head and upper neck is a dark blackish brown, with a pronounced bluish-purple gloss; there is a broad white neck-ring; the back of the neck above the mantle and side of the chest are brownish-grey with white edgings; the mantle, scapulars, and back, blackish brown with greyish edgings on which is a slight purplish gloss; flanks and thighs, brownish-grey with white or light grey edgings; under parts, white; chest, light brown. Primaries, dark brown; wing-coverts, black; secondaries, white in centre and black on outside; rest of the wing, brown, with white edges to median coverts.

In November the new inner scapulars appear, and these at once give a character to the identification of the species. The black portion of the inner scapulars is much extended in Barrow's Golden-Eye, whereas in the Common Golden-Eye it is confined to the margin of the feathers. At this date, too, the first white feathers come in between the bill and the eye. These increase in number throughout the winter, whilst numbers of pure white feathers come on the chest until the brown of immaturity disappears. Thus the advance of plumage continues to take place until March, when the young male has gained a considerable portion of its first spring dress, which is more or less similar to the adult male, except that the black and white scapulars are never fully attained, nor are the hind neck or flanks complete. The wings and tail still show the bird to be immature until the latter part of June or early July, when the usual complete moult takes place, the whole of the bird going into a partial eclipse similar to the adult male. In September the eclipse is shed, and all traces of immaturity have disappeared, so that in the following month, or more correctly speaking November, the bird is adult, at about sixteen months. At first the feet are brownish ochre, with dusky webs.

Adult Male.—The head and upper neck are black suffused with bright blue purple, or steel blue with no green sheen; in front of the eye is a large crescentic white patch which in November is often slightly flecked with black where it meets the bill; hind neck, chest, and under parts white; mantle, scapulars, wing-coverts, back, black; the central feathers of the scapulars are black and white, the inner feathers forming a white line from the shoulders to the wing-coverts; the flanks are interspersed with black feathers where they overlap the wings; middle secondaries white, secondary coverts in the centre black above, white below; median coverts white in the centre and black edged with white, the remaining portion of the wings black except the primaries, which, with the tail, are brown; thighs, brown. Feet and legs yellow, with black webs; irides, bright golden yellow; bill, bluish black. Total length, 22 inches; wing, 9.75 inch; bill, 1.40 inch.

In the case of both adult male and female the bill is proportionately larger than in the Common Golden-Eye. It is much higher also at the top, where it joins the forehead, and seen from above, broader; it becomes narrower as it projects, but has a larger and broader nail, so much so, the nail at the end of the bill extends over half its entire breadth, whereas

in the common species it extends only over one-third of its breadth. This is a good point for identification.

At the beginning of July the adult male undergoes a fairly complete change to an eclipse plumage, although the white feathers in front of the eye are never completely lost. In this month the head and neck become a somewhat dirty grey brown, very light in the throat; the flanks, hind neck, and upper mantle, also portion of the lower neck and chest are brown with grey edgings; mantle, scapulars, brown, with light brown or grey edgings or tips; the whole bird now resembles a somewhat dirty-looking female, but its sex can easily be recognised by its superior size, small white feathers on the head, and by the wings, which always remain the same, which, with the tail and part of the back and tail-coverts, are only moulted once in the season. The adult male has scarcely assumed its eclipse dress before it again commences to moult into winter plumage, and in the case of all these ducks the process of change at this season may be said to be practically continuous. A bird before me, shot on October 4th, shows that a great proportion of the winter plumage has already been assumed on the cheeks, mantle, scapulars, and back. The hind neck and flanks seem to be the last parts to lose the eclipse feathers. By the second week in November the adult male has again reassumed his full dress. From the fine series of these birds in my own and Mr. E. Lehn Schiöler's collections, it is quite clear that Barrow's Golden-Eye follows a course of plumage from birth to maturity similar to the Common Golden-Eye.

BREEDING RANGE.

Iceland.—Ornithologists such as Hantzsch, Slater, Coburn, myself and others who have visited Iceland bear testimony to the commonness of this species in the Myvatn district, where it breeds in some numbers. It also breeds in small numbers in the east and west of the island near the coast, where there are rivers flowing into lakes. I did not see the species in the south, but only one female of the Common Golden-Eye with young.

Greenland.—Breeds in the south between $63^{\circ} 45'$ and $64^{\circ} 30'$ N. (Holböll), apparently not further north than Godthaab. It is common about Julianshaab (Dr. Deichmann).

With reference to its breeding range in Greenland, Mr. E. Lehn Schiöler kindly sends me the following note:—

"The main breeding-place for Barrow's Golden-Eye in Greenland is supposed to be in the Godthaab district. It has been proved that it occurs, probably breeding in the fjords, along the west coast from Nanortalik to Godthaab, and I have secured specimens from Julianshaab. Godthaab was taken to be the limit of its distribution to the north, but the Zoological Museum here has a male from Governor Fencker's collection shot 1st of June 1896, near Holsteinborg, and I have received several specimens from Sukkertoppens district, mostly young birds, however.

"We must not forget that a good many birds cross over from America, so specimens met with farther north may not have been reared in Greenland.

"Information on the point is to be found in Winge's *Grönlands Fugle*, 1898, and with Holböll.

"My friend Dr. Krabba, who has stayed in Greenland twelve years, mostly in the Godthaab district, tells me that there is a certain place up in the Godthaabsfjord where the bird is always to be met with in summer; it is near some waterfalls on inaccessible little islands, and the nest is therefore never taken; this is well in accordance with Holböll's remarks. The name of the little 'Udligger'-place is Kornok, the very spot where my *Clangula gl. am.* was killed."

N. America.—Breeds "from the Gulf of St. Lawrence, Rocky Mountains, Mountains of Colorado, and Alaska northwards" (Dresser); N. Montana (Coues), Kicking Horse

Lake (Macoun, *Cat. Canadian Birds*, 2nd ed. p. 100); British Columbia (Macoun); Banff, B.C. (Raine); N.E. Labrador (Hantzsch, *J. F. O.*, 1908, p. 339); Washington (Dawson, *Auk*, 1897, p. 172); I saw specimens killed in summer at Wrangel, Alaska, 1908, where it is said to breed in the mountain lakes. "Breeds from Quebec and Washington, the mountains of Oregon, south in the Rocky Mountains to Colorado, north to Chilkat Peninsula, Alaska" (*The Water-Fowl Family*, p. 148). This duck occurs in Hudson Bay in summer, but of its breeding range throughout N. Canada we have little information.

Allan Brooks, referring to the breeding of this species in the Cariboo district, B.C., says in a note to me:—

"A rather scarce breeder in the neighbourhood of 158-Mile House, but common in La Hache Valley. One set of eggs was taken from a hole in a dead Douglas fir, fifty feet from the ground, probably the deserted nest of a flying squirrel. The tree stood about four hundred yards from the nearest water. The eggs (seven) at this date (17th June) contained large embryos. I saw another nesting-hole, but was unable to reach it. The female brought fourteen young ones out from this."

MIGRATION RANGE.

Europe: British Isles.—There are several old records of this species which are not reliable.¹ The most recent occurrence is said to be a young male of this species obtained in the river Alde, Suffolk, February 1, 1908, and exhibited by Mr. F. Menteith Ogilvie at the B. O. C., March 17, 1909 (*Bull. B. O. C.*, xxiii. p. 63). Mr. Ogilvie gave good reasons for supposing it might be an immature male of *C. islandica*, and Mr. Ogilvie-Grant expressed his opinion that such was the case, but there are no specimens of immature Barrow's Golden-Eye in the British Museum, so that identification must be considered unsatisfactory. When I had obtained a fine series of immatures, I asked Mr. Ogilvie to send me his bird for identification, but he was unable to do so as it had been warehoused. As the bird was killed on February 1st, identification would be easy by examination of the shape of the inner scapulars.²

Spain.—Valencia, December 22, 1871 (Dresser).

Scandinavia.—Has occurred twice in Finmark, Nyborg, Varanger Fjord, 1848, and at Vardö, 1851 (Dresser, *Birds of Europe*, vi. p. 604).

From all accounts I fancy the species must occasionally occur in Finmark; said to have occurred in Finland (Palmen, *J. F. O.*, 1876, p. 58) and Belgium (Fallon, *Oiseaux Belg.*, p. 226). Winters on the south and east coasts of Iceland.

N. America.—Only rarely does Barrow's Golden-Eye range south to the coasts of New England and Massachusetts. Even in Newfoundland it is rare on migration, though there are specimens in the St. John's Museum. Not uncommon in the Bay of Fundy in winter (Dresser), and regularly taken on the coasts of Maine and New Brunswick. Prof. Elliot has found it numerous at times on the St. Lawrence, near Ogdensburg; winters chiefly in Southern Greenland and South-eastern Alaska. Only rare and occasional in winter in N. Carolina, Ohio, Indiana (Butler), Illinois, Minnesota, S. Dakota, Colorado, Utah, Idaho, Oregon (Merrill), and California, Wisconsin (C. B. Cory).

HABITS.—The habits of this species seem to be very similar to the Common Golden-Eye. In summer I found both males and females unusually tame in Iceland, but this was when

¹ See *Zoologist* (1864, p. 9038). Prof. Newton characterised this record as worthless.

² Since this work has been in the press Mr. Ogilvie-Grant has shown, by an explanation of the above-mentioned characters, that the bird in question is only a specimen of the Golden-Eye (*Bull. B. O. C.*, vol. xxxi., November 29, 1912).

the species was frequenting narrow rivers where it seemed very disinclined to rise in flight. In winter, both on the coasts of Iceland and in Greenland, it is said to be the shyest of all ducks and the most difficult to shoot, flying high, and taking alarm on the approach of man, even at a considerable distance. Both in Iceland and Greenland the species is locally migratory. A few remain all the winter on the Skalfandi Laxa, and south of this near the warm springs, which do not freeze, and about Grönavatn, but the majority repair to the coast in early November, and frequent the narrow bays of the north coast unless these are frozen. That they stay on the north coast about Husavik is proved by the fact that Mr. Schiöler and myself have received many specimens from our collector, who killed them in the neighbourhood of Husavik in December and January. Some also stay about the mouth of the river that flows into Akureyri Fjord all the winter, unless exceptional conditions prevail, and I have no doubt they are found in many other sheltered bays on the north coast. Many Barrow's Golden-Eye also frequent the mouths of rivers on the south and east coast of Iceland in winter. Dr. Deichmann, who has spent six years in West Greenland, tells me that the breeding and the migratory range of this species is very restricted in that country, and that the birds, even in winter, never go much farther south at that season, but frequent the open fjords on the nearest sea-coast about Julianshaab, and as far north as Godthaab. The few emigrants that touch Newfoundland in winter are probably birds bred on the eastern fjords and rivers of Labrador.

On the water the male of this species looks a larger, clumsier, and blacker bird than the Common Golden-Eye. It seemed to me that it sits higher on the water, and was a bird that commanded instant attention. In summer the males, which, when the ducks have begun to sit, consort in small parties of two to six, or more, are exceptionally tame, and will permit an approach to within a few paces, if the observer moves slowly to the banks of the river where they are feeding or resting. In rising to fly they are somewhat clumsy, and run along the surface with considerable splashing, but they did not seem to me to make nearly so much noise in flight as the common species. The "singing" or "ringing" note is heard, but it is neither so loud nor so metallic. On June 27th the males were still in their breeding dress. A few seem to keep on the river near the nesting females as if for form's sake, but the majority were resorting to the great lake of Myvatn, where the parties seemed to increase in size day by day. Females, with young, often floated past me whilst I was trout-fishing, and once I had to draw in my line to prevent hooking a too confiding mother. Whilst watching males on feed, it struck me that they were less expert than the Common Golden-Eye, and had more difficulty in getting under water. There was more noise and splash to get under, but once below the surface they seemed to be skilled performers of the highest order. I saw them more than once, from the high bank where my tent was pitched, feeding in exactly the same manner as the common species, turning over all the small stones, and probing beneath all large ones, and into holes. They stay less time under water in shallows than in the deep water of the lake, the time occupied being a half to one minute. On the river they reappeared again and again at the same spot, only pausing for a moment's rest and splash down again, whereas on the lake they would often keep moving forward in their dives, and take up a fresh position every time. They will stay and fish in very rough streams, edging into the current and out again as soon as they rise, but do not like such wild places as the Harlequin. The food seems

to consist of shell-fish of all kinds, crustacea, fish and water insects. This is generally procured in water of no great depth, but Dr. Deichmann says they feed in the Greenland fjords in several fathoms of water.

Barrow's Golden-Eye arrive at their breeding places about the end of March, in flocks, and at once proceed to pair. I have been unable to discover any ornithologist who has seen the courtship display of this species, but I have little doubt that when we are able to procure specimens alive from Iceland, and keep them in good health, we shall find that it is much the same as that of the Common Golden-Eye. The nest is usually placed in a hole in the bank of a stream flowing into a lake, in a hole in the lava rocks close to the water, or on some low island under bushes of dwarf willow, dwarf birch, amongst coarse grass or low scrub, such as *Empetrum nigrum* or *Azalea procumbens*. I found two nests just tucked in under large stones, and not two feet above the level of the stream. They are also said to nest in the turf walls of the sheep-shelters.

In America the nest has been found in a hole in a dead Douglas fir, 50 feet from the ground (Macoun, *Cat. Canadian Birds*, p. 100), and as it nests in the mountain lakes of the Rockies, it is probable that such a place is a favourite site. The nest itself is somewhat carelessly put together, the bottom layer being moss interwoven with twigs of dwarf birch and willow, coarse grass, *Azalea procumbens* and *Empetrum nigrum*. Two nests found by myself were somewhat broad and flat, with very little hollows in the middle. In them were 9 and 10 eggs respectively, but the bird generally lays 12 to 14 eggs, exactly similar in colour to the common species, only much larger.

Riemschneider gives us an account of the places in which he found their nests at Myvatn. He says:—

“The nest was always placed in more or less of a hollow, in natural hollows of the rocks, in covered-over cracks in the lava, or, as already mentioned, in the outer walls of peat shelters, erected for sheep, where a few blocks of peat have been taken out, to form a nesting place, and even, and that not seldom, inside the shelter, in which case the food-rack or a place like it would serve as a nesting place; as exit for flight the door of the shelter would in such a case be used. Such customs have given rise to the Iceland names for the species. In the natural hollows, holes in the rocks, fissures, &c., the nest is placed now in the foreground, now so far inside that you could not reach to it from the entrance opening, but were obliged to lift off the stones covering it for this purpose. Whilst as a rule the position of the nest is to be found approaching the level of the surface of the ground, I saw a nest in the Kalvaströnd which was built in a hollow in the lava at more than twice a man's height. In the nest-trough, which was formed to begin with in the food-racks of the stalls, by pulling together dry grass stalks and other remnants of food round the nest, there was a very ample, delicate lining of whitish down, which had a very small admixture of fine, dry parts of plants. The eggs, 12 to 15 in number, and only exceptionally more, are distinguished from other ducks' eggs by their pure, blue-green colour, are rather bulgy in shape, and have a smooth, not very shining shell.”

The eggs of this species are said to be far superior for the table to those of any other ducks in Iceland.

The female Barrow's Golden-Eye surrounds her eggs with down in a fashion similar to other ducks, and, like other species, is most assiduous in the care and upbringing of her family. In all the general habits, such as the flocking on lakes and ultimate journey to the coast, and life there, this species seems to be similar to the Common Golden-Eye. They are shy birds in winter, seldom giving the gunner a chance.

In Iceland their enemies seem to be Richardson's Skua, *Storcorarius parasiticus* L.,



Myrvaln in June.

which regularly attacks the females of all diving ducks and seizes their young, and the Iceland Falcon, *Falco rusticolus islandicus*, which kills a few of the adults.

There was hardly a morning or evening when I stayed at Myvatn, in June-July 1889, that we did not see one or other of these two species harrying the ducks.¹ Sitting in the tent to escape the awful plague of flies, a sudden roar of startled ducks would be heard, and on my going to investigate there was the falcon, with perhaps two young birds in attendance, bearing off some victims of its prowess. None of the ducks seemed to be unusually scared when the falcons passed by, as they often did, by day and night. They crouched on the water or rushed with their broods under the banks and hid as well as possible. It was only after the stoop and kill, when the bird of prey came on to their own level, that there was a general stampede of these ducks in the immediate vicinity of the murder.

One morning (July 3rd) my brother, sister, and myself were having breakfast, and were treated to an unusually fine spectacle. A large adult White-tailed Eagle came floating up from the lake and following the course of the river. Every duck that was capable of rising got up and flew before him, and passed our camp within 40 or 50 yards. There must have been 500 or 600 ducks in this royal procession, and his majesty took not the slightest notice of them, but stayed for a while over an open arm of the river, where we saw him clumsily dash down and seize a large trout that must have weighed three or four pounds, which he took to an adjacent rock to devour. I surmised that the ducks, in trusting themselves in the air in front of the sea eagle, were not very frightened of him, but sufficiently scared to wish to get out of his way. This eagle probably only kills "cripples" and young birds unable to fly.

¹ The methods of the Skuas I shall describe later.

BUFFEL-HEADED DUCK

Clangula albeola (Linnæus)

- The Little Black-and-White Duck*, Edw. Nat. Hist. Birds, ii. p. 100, pl. 100 (1747).
Anas albeola, Linn., Syst. Nat., Ed. X. i. p. 124 (1758).
Anas hyberna, Briss. Orn. vi. p. 349 (1760).
Anas querquedula ludoviciana, Briss. Orn. vi. p. 461, pl. xli. fig. i. (1760).
Anas querquedula Carolinensis, Briss. Orn. vi. p. 464 (1760).
Anas albeola, Linn., Syst. Nat., Ed. XII. i. p. 199 (1766 ex Edwards).
Anas bucephala, Linn. Syst. Nat. i. p. 200 (1766). (♂).
Anas rustica, Linn., Syst. Nat., i. p. 201 (1766). (♀).
La Sarcelle blanche et noire ou La Religieuse, Buff. Hist. Nat. Ois. ix. p. 284 (1783). (♂).
La Sarcelle de la Caroline, Buff. Hist. Nat. Ois. ix. p. 286 (1783). (♀).
Clangula albeola (Linn.), Steph. in Shaw's Gen. Zool. xii. pt. ii. p. 184 (1824).
Fuligula albeola (Linn.), Bp. Ann. Lyc. New York, ii. p. 394 (1826).
Bucephala albeola (Linn.), Baird, B. of N. Amer., p. 797 (1858).
Charitonetta albeola (Linn.) Stejneger, Bull. U.S. Nat. Mus. p. 166 (1885).

LOCAL NAMES.—Buffel-headed Duck, Buffle-headed Duck, Buffle-head, Butterbox, Marionette, Butterball, Spirit Duck, Dipper, Little Dipper, Little Black and White, Little Brown Duck, Buffalo-headed Duck (*English*); Sarcelle de la Louisiana, Sarcelle de la Caroline, La Religieuse, Sarcelle blanche et noire, Petit Canard à grosse tête, Garrot albeole (*French*).

Egg.—6 to 14 in number, according to A. W. Butler; clutches of 7, 8, 10, and 12 are mentioned by W. Raine, 8 (Stark) and 9 (Lockhart). Colour creamy white, with "a tinge of greyish olivaceous" (Dresser); from inside they are said to show a greenish tinge, but Mr. Allan Brooks tells me this is incorrect, and that they are always ivory-white without any tinge of green. Shell smooth and close grained, with a very hard surface. Average size of 13 eggs, 51.7×36.84 mm., max.; 55×37 and 51×37.5 , min. 50×37 and 51×35.5 (F. C. R. Jourdain).

The nesting down is greyish-white and often mixed with particles of wood from the hole. A few greyish-white flank feathers with darker shafts may be found among the down.

Young in Down.—Entire body covered with short soft down; crown, sides of head, nape, and upper parts deep dark brown, marked with a large white spot on each side of the lower back, and on each side there is a longitudinal patch of white not so round as in the Golden-Eye. Chin, lower cheeks, and upper throat white; lower breast, grey; under parts white, marked with dark brown on the thighs and grey about the anal portion; wings, dark brown on the upper half and pure white on the lower half, with a considerable portion of greyish white about the edges where the bastard wing and primaries will appear. Bill and legs slatey-brown. In the early stages the bill is very small and pointed.

Immature Male.—Considerably larger, especially about the head, than females, either adult or immature; in first plumage (October) the young male has the head and neck black, suffused with grey; a white patch larger than that of the female extends from below the



BUFFLE-HEADED DUCK

Adult male and female.

eye on the cheeks to the long dark feathers of the crest; nape, mantle, scapulars, back and rump black, edged with dark grey; wing-coverts, blackish brown; tail black, suffused with a grey sheen; flanks grey, turning to pale brown at the thighs; wings blackish brown, except the middle secondaries, which are white, and the smaller secondaries white edged with brown; upper tail-coverts, light grey; vent and thighs, light-grey; under parts and chest, white; sides of the chest grey, with sandy tinge to the edges of the feathers. The plumage advance appears to proceed more slowly than is the case with the Golden-Eye. In fact there is not much change in the dress of the immature male until February. A young male killed in February shows that the tail and all the lower parts about the belly have been replaced by adult plumage. The head and neck are in a state of moult, and the new black feathers on the head have obtained some degree of purple.

From specimens in American collections it is clear that the young male only attains rather more than half his adult plumage in the first spring, and that its subsequent changes are a partial eclipse which is assumed in July, then a general moult takes place in August and September, and the subsequent full winter plumage is attained (very slowly) in November or December.

Adult Male.—A broad white band covers the cheeks from below and behind the eyes, and passes round to the nape; the rest of the head and upper neck glossy black, and much elongated; chin and crown feathers glossed with purple; the remaining dark parts shot with bottle-green; centre of the back, mantle, parts of the scapulars, inner secondaries, rump, and wing-coverts velvety black; outer scapulars, white, edged with black; primaries, black; central secondaries, white; outer secondary feathers edged with black; rest of the wing, white in the centre, and black with white-edged feathers on the outer sides of the wing; flanks, chest and lower neck, vent and under tail-coverts, white; upper tail-coverts, whitish-grey; tail, grey; lower parts from chest to abdomen, greyish-brown edged with white; legs and feet, yellow underneath, with a complete flesh-pink suffusion;¹ irides, rich brown; bill, dark lead-blue, becoming greyest towards the nail, with light yellowish edge to the upper mandible; nail at end of bill, bone-yellow. Length, 13 to 14 inches; gape, 1.5 inch; wing, 6.7 inches; tarsus, 1.3 inch; culmen, 1.45 inch.

In July the adult male assumes a fairly complete eclipse, resembling a similar stage of plumage in the Golden-Eye.

Adult Female.—Head, neck, back, rump, and tail, brown, the tips of the tail and sides having a greyish sheen; many of the feathers of nape mantle and outer scapulars are edged with grey; a somewhat large patch of white extends along the cheeks; wings, blackish-brown, with central secondaries, white; flanks, ash-grey; under parts, white; vent and thighs, ash-grey; bill, legs, and feet similar to male, only darker. Length, 12 to 13 inches; gape, 1.25; wing, 6.25; tarsus, 1.2. Bill, pale to dark lead-grey; iris, brown; feet, dusky bluish-grey, sometimes tinged with pink.

Immature Female.—There is very little difference between the young female in November and the adult, the principal characters being that the young bird has a smaller cheek-spot, and the head grey-brown and much lighter than the adult. The mantle and

¹ Nearly every authority gives a different colour to the feet and legs. Naumann says "yellowish light-brown"; Dresser, "yellowish" (the plate, p. 439, showing bright yellow); Mr. Saunders and American authorities alone give yellowish-pink, which is correct. The specimen from which I took the colours, an adult male which I killed in Ontario in October 1899, was a typical one. The yellow shining through the rosy-pink was most noticeable in the hind toe. The rosy tinge disappeared a few days after death.

flanks are also lighter in tone. By the month of March it is difficult to distinguish young from old females. I do not think that the immature female Buffel-head Duck breeds in the first year.

BREEDING RANGE.—This distinct Nearctic species breeds very generally throughout Central and Western Canada and North-western America, and only very rarely occurs on migration in Europe.

Its principal breeding grounds are the mountain lakes of British Columbia and Alaska. It breeds on the Lower Mackenzie River, the Great Slave Lake, and throughout Keewatin, on the Yukon and probably on Dease Lake near the Liard (where I saw specimens in 1908), and throughout this region. It is rare in the extreme north about Point Barrow and Saint Michael district, and occurs in Unalaska and the Aleutian chain of islands only in winter (Turner, *Contrib. to the Nat. Hist. of Alaska*, p. 134). Throughout British Columbia it breeds (Macoun, p. 101, and others). It also breeds in Alberta, Saskatchewan, Manitoba, and Ontario.¹ It probably also breeds in Quebec, where I observed many at the end of the breeding season, and possibly in New Brunswick (Chamberlain), and N.E. through Quebec and Hudson Bay. According to Marsh it breeds in N. Ohio. It is believed to nest in limited numbers in N. Dakota, Maine, Minnesota, Wisconsin, Iowa, and certainly in the N. of Montana (Coues, *Bull. U. S. Geolog. Survey*, iv., No. 3, p. 653). At present there are no records from Labrador, where it probably breeds in the interior.

MIGRATION RANGE.

Europe: British Isles.—There seem to be only two authentic records of this duck in our islands. The first is that of a male shot near Yarmouth in the winter of 1830. Formerly the specimen was in the collection of Mr. Miller, and then in that of Mr. Rising of Horsey. At the dispersal of the last-named collection it was acquired by the Norwich Museum. The second example, an adult male, was killed in the winter of 1864-5 on the Bessingby beck, close to the town of Bridlington, Yorkshire, by Richard Morris, and was for some time in the collection of Mr. Machin, whence it passed into the collection of Mr. J. Whitaker of Rainworth, where I have seen it. With regard to the two Scotch records of this bird, I agree with Mr. Harvie-Brown that they are quite unreliable.

Asia.—It is recorded from Bering Island (January 19th) by Dr. Stejneger, 1883 (*Orn. Exploration in Commander Isles, &c.*, p. 166). This is as we should expect, for a few are found in winter in the Aleutian chain (Turner).

N. America.—Of casual occurrence in Nova Scotia and Newfoundland, and winters in New Brunswick, western New York, Ohio; common in Indiana (A. W. Butler), Michigan, Illinois, Wisconsin (C. B. Cory), Oregon (J. C. Merrill). It is also very numerous from the coast and open inland waters of British Columbia south to Lower California and Texas (Dresser). Only occasional in Mexico (Dresser), Bermuda (Wedderburn), Florida and Cuba (C. B. Cory, *Auk*, 1888, p. 67). It has occurred in Hawaii, and has been once recorded from Greenland, near Godthaab (1830).

HABITS.—This bright little duck is by no means shy, and in its home it is easy to study. Its general habits, which I have observed in Ontario, Quebec, and British Columbia, are not very gregarious, for they are most often seen in little parties of three to

¹ Saunders and M'Ilwraith say it is *said* to breed there. This is no doubt correct, as I saw many there in autumn, and my Indians, who lived in these woods, pointed out to me the woodpecker holes in which they said these ducks always nested.

a dozen individuals. Both by their small size and the conspicuous plumage of the males they are easy to identify, and cannot be mistaken for the Golden-Eye even at a considerable distance. They dive with surprising rapidity, and, if alarmed, differ from all the other diving ducks in the light way in which they rise to wing. When leaving the water they "spring" very nearly as lightly as a Teal, and fly, always over the water, with rapidity although at no great height. Both for their quickness in diving and taking to flight the Indians call them the "Spirit" duck, for in olden days it was next to impossible to kill them with the flint-gun and the arrow; but with modern weapons the case is different, and I found them amongst the easiest diving ducks to kill I have encountered. Both in Central Canada and in British Columbia they are very fond of frequenting slow-moving rivers connecting large lakes, and along these narrow waters they would always fly at about fifteen yards above the water, if moved from above or below by one of my Indians. By this method I shot all the adult and immature specimens I required in two days, and was afterwards content to stalk them and watch their habits when undisturbed. All along the east side of the Island of Vancouver, which is a perfect paradise for sea ducks from October until the spring, Buffel-headed Ducks were very abundant, but here, as on the east coast of America, they are much shyer and not so easily cornered. In the Bay of Fundy, New Brunswick, Mr. Dresser says (*Birds of Europe*, p. 591) he found no difficulty in shooting them, and that they were common there throughout the winter, whilst most American wild-fowlers consider them numerous along the east American coasts, especially so along the New England shores, and easy to kill.

At all seasons Buffel-headed Ducks keep by themselves. In winter they frequent shallow sandy bays, and are fond of the same sort of ground to feed in as the Golden-Eye, namely, estuaries and edges of tide-rips. They are also restless, constantly flying from one feeding ground to another, and in so doing generally pass sandy bars at the same spot day after day, where gunners who know their habits often kill large numbers.

The Buffel-head floats lightly on the water. When undisturbed the head is well sunk to the mantle, and the feathers of the cheeks much puffed out. The crest, too, is frequently frilled out so that it has a fluffy appearance. American authors say that some sentinels are always left on the surface of the water when a flock are feeding, so as to give alarm in case of danger, but I have not noticed this amongst the small flocks. I have observed in autumn and early winter they all, on the contrary, dived together with great rapidity, and on coming to the surface again, seemed to detect danger quite as quickly, if not quicker than Golden-Eyes. In the case of danger being close at hand they took to wing at once, flying immediately their heads appeared above the surface, but at a distance they would dive again at once, and only fly when they thought they were well out of range. The flesh of those killed in autumn, especially young birds, was eatable, though inferior, but after they go to the sea they are as unpalatable as other true sea ducks. I have heard the female give a low grating note, very similar to that of the Golden-Eye, but not so loud, and it is most probable that the male has a distinct call as well as a whistle during courtship. From what I could gather from naturalists in British Columbia the courtship is very like, if not exactly similar to, that of the Golden-Eye, but no one seems to have observed it at close range.

Buffel-headed Ducks leave the east and western coasts of America in March, and move to their breeding grounds in the interior and the North-West. The nest is usually placed in

a hole in a tree near the water. Mr. Allan Brooks kindly sends the following note concerning the birds which nest in the Cariboo district of British Columbia. He says:—

“Almost every lake has one or more pairs of these charming little ducks. Unlike Barrow’s Golden-Eye, the nests were always in trees close to, or but a short distance away from, water. These nests were invariably the deserted nesting holes of flickers, and in most cases had been used several years in succession by the ducks. The holes were in aspen trees, from 5 to 20 feet from the ground, and the entrance was not more than $3\frac{1}{4}$ inches in diameter. The number of eggs ranged from two to nine, eight being the average; in colour they resemble old ivory, without any tinge of green. I have several times seen the eggs of this duck described as ‘dusky green,’ but these have evidently been the eggs of some species of Teal. The female Buffle-head is a very close sitter, never leaving the nest until the hole was sawed out, and in most cases I had to lift the bird and throw her up in the air, when she would make a bee-line for the nearest lake, where her mate would be slowly swimming up and down unconscious of the violation of his home. In many cases the eggs had fine cracks, evidently made by the compression of the bird’s body when entering the small aperture.”¹

Raine describes nests in holes in poplars in Manitoba, and A. C. Stark also found the entrance hole in an oak tree to be the work of a Woodpecker. In treeless districts, such as the Missouri coteau in Saskatchewan, Raine says the nest has been found at the end of a gopher burrow by a lake side (quoted by Macoun, *Cat. Can. Birds*, p. 101). Stark says that when flushed off the nest the duck dropped to within a foot of the ground from a Woodpecker’s hole about 20 feet high, and flew into the thickest part of the wood, dodging between the trees with astonishing rapidity (quoted in Dresser’s *Birds of Europe*, vi. p. 592). Wood ducks and Mandarins when flushed off the nest also adopt similar tactics, and I have seen a female Teal do the same thing, preferring such a retreat to flying to the water. Mr. Lockhart describes a nest which he found in a rotten stump near the Yukon that contained nine eggs, and another in the Black River in a poplar tree that contained ten eggs. Full clutches may be found during the last week in May and the first week in June. The nests are lined with down, and no material is carried into the hole to form a foundation.

Both on fresh water and salt water the food of this species appears to be much the same as the Golden-Eye. The stomachs of those which I killed in Ontario were full of water-beetles and small freshwater snails.

I am indebted to Mr. Allan Brooks, the British Columbian naturalist, for the following notes on the Buffle-headed Duck. He says:—

“I have never seen a large flock of this species, twenty birds together is unusual, and when they rise they usually string out in twos and threes, never, to my knowledge, flying in a mass, or even in regular formation.

“Males keep in the vicinity of the brooding female until the young are hatched, when they disappear. I have never seen nor shot one in eclipse plumage, though I have seen allied ducks (Harlequins) in great straggling flocks on the sea-coast, all apparently adult males unable to fly through the loss of the flight feathers. But I have never seen similar congregations of Buffle-heads, though the bird is so common.

“The males are in full plumage again early in October. They pair late; very often I have seen six or eight adult males together in April, though the courting actions may commence much earlier. When courting, the male makes short circling flights, low over the water, rising a little before alighting again with spread and downward bent wings.

“The only note I have heard is a low croak. When courting, these ducks seem oftener to go in

¹ See also *Auk*, vol. xx. No. 3, July 1903.

Buffel-headed Duck

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small flocks than in pairs or threes. The males chase each other a good deal on the water, with low chuckling croaks, the chase usually ending in the 'display' flight of one of the males.

"The Buffle-head winters in large numbers on the coast of B.C. In the interior it is scarcer at this season, though a few remain on the larger lakes that do not freeze. In February their numbers are augmented, and by March they are very common, adult males predominating, as is the case with nearly all ducks in the northern portion of their range at this season.

"The species nests sparingly on the small ponds and lakelets in the neighbourhood of Okanagan Lake, south 49th parallel. The only nesting record I have for the southern coast district is one for Sumas Lake, where I once saw a female with two half-grown young."

LONG-TAILED DUCK

Clangula hyemalis (Linnæus)

- Anas hyemalis*, Linn., Syst. Nat., Ed. X., i. p. 126 (1758).
Anas longicanda islandica, Briss. Orn., iv. p. 379 (1760).
Anas longicanda ex insula Terræ-Novæ, Briss., tom. cit., p. 382 (1760).
Anas querquedula ferriensis, Briss., tom. cit., p. 466, pl. 40, fig. 2 (1760).
Anas hyemalis, Linn., *op. cit.*, p. 202 (1766).
Anas glacialis, Linn., Syst. Nat., Ed. XII., i. p. 203 (1766).
Le canard à longue queue de Terre neuve, Buff., Hist. Nat. Ois., ix. p. 202 (1783).
Anas miclonia, Bodd., Table des Pl. Enl., p. 58 (1783).
Anas brachyrhynchos, Beseke, Vög Kurl., p. 50, pl. 6 (1792).
Anas longicanda, Leach, Syst. Cat. M. and B., Brit. Mus., p. 37 (1816).
Clangula glacialis (L.), Boie, Isis, 1822, p. 564.
Platypus glacialis (L.), C. L. Brehm, Lehrb. Eur. Vög., ii. p. 840 (1824).
Platypus faberi, C. L. Brehm, *op. cit.*, p. 1004 (1824).
Heralda glacialis (L.), Steph. in Shaw's Gen. Zool., xii. pl. 11, p. 175 (1824).
Fuligula glacialis (L.), Bp. Synop. B. U. S. in Am. Lyc. Nat. Hist., New York, 1826, p. 395.
Pagonetta, Kaup (*Anas glacialis*, Linn.), Nat. Syst., p. 66 (1829).
Clangula hiemalis (L.), C. L. Brehm, Vög. Deutschl., p. 933 (1831).
Clangula faberi, C. L. Brehm, *op. cit.*, p. 935 (1831).
Clangula megauros, C. L. Brehm, *op. cit.*, p. 936 (1831).
Clangula musica, C. L. Brehm, *op. cit.*, p. 937 (1831).
Clangula brachyrhynchus, C. L. Brehm, *op. cit.*, p. 938 (1831).
Crymonessa glacialis (L.), MacGillivray, Man. Brit. B., ii. p. 186 (1842).

LOCAL NAMES.—Long-tailed Duck, Long-tail, Curlwee, Calloo, Calloo Duck, Coal-and-Candle-Light (*East Coast, Scotland*); Ice-Duck (*English*); South-southerly, Old-wife, Old Indian, Old Molly, Old Billy, Cockawee, Cowee, Long-tailed Duck, Scolder, Old Squaw, *English (N. America)*; Ian Bochainn, Ian Bachainn (Ocean bird), Ian Buchainn (Melodious bird) (*Gaelic*); Harelde glaciale (*French*); Moretta codona (*Italian*); Eisente, Winterente, Eistavchente (*German*); A-had-lin, A-dyigia (*Point Barrow Esquimaux*); A-lang-uk (*Alaskan Esquimaux*); De Ijseend (*Dutch*); Havlet, Havlyk (*Danish*); Edvedla (*Faroese*); Aglek (*Greenlandic*); Havelli, Foella (*Icelandic*); Alli (*Finnish*); Isand, Havelle (*Norwegian*); Alfögel (*Swedish*); Vostrohlostka, Javk, Morjanka (*Russian*); Shima-aji (*Japanese*).

Egg.—Usually 5 or 6 to 9 in number, rarely 10; shell glossy, and the shape elliptical or blunt oval; colour, pale greyish-green, ranging to buff or brownish-buff. Average size of 100 eggs, 53.62 38.65 mm. Maxima, 59.5 × 40, and 57.5 × 40.5; minima, 49.5 × 33, and 58.5 × 36 mm. (F. C. R. Jourdain). Weight, 3.114 gr. (Rey); 3.22 gr. (Le Roi, 6 eggs).

Down.—"Dark sooty brown with dull white spots" (Dresser). (See also descriptions in *Zoologist*, 1906, p. 373; *Brit. Birds*, ii. p. 39 (pl. ii. fig. 12, flank feathers). The down is not so dark as that of Scaup or Scoters; Hantzsch describes it as "pale-brown."

Young in Down.—Crown of the head, eye stripe, centre of cheek extending to angle of the mouth, back of neck, all upper parts, dark brown; the rump and back of the head are darkest, whilst the edge of the wings and nape are greyish-brown. The down round the neck, forming a complete collar, is grey-brown; between the brown at the angle of the mouth and crown is a brownish-white spot. There are also two similar spots in front



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LONG-TAILED DUCK (SUMMER)
adult male and female

of the eye divided by the eye stripe, and one more just above and behind the eye. The lower eyelid is also brownish-white. Throat, chin, and lower parts white, turning to grey about the vent. Front of thighs, brown; irides, large and dark yellow-brown; bill, black, with nail pale-brown and nostrils blackish-brown; inside of bill, grey; legs and feet, dusky greenish-black, with the hinder parts, soles of feet, and webs black. A greenish stripe extends along the toes.

Immature Male.—In first plumage, in September, the young male has the crown dark-brown; the back of the neck is greyish-brown till it meets the mantle, which, with the wings, back, and tail are black, with a dark-grey suffusion. A dark band of greyish-black also crosses the upper part of the chest, and these feathers, as well as the grey and spotted ones on the sides of the chest, are edged with light sandy-brown; the scapulars blackish-brown, edged with light sandy-brown; flanks grey, tinged with sandy-brown; thighs, grey; breast, belly, and vent white. In many specimens only the centre tail-feathers are black, the rest being brown, edged with white, whilst some have a few sandy-edged feathers on the upper tail-coverts. Round the eye and lores whitish-grey; cheeks, throat, and chin brown-grey. In many specimens the secondaries are brown, and the breast spotted with brownish-grey. In this month the young male is no larger than the female, but by the end of October it has grown to nearly the full size of the adult male. By the end of this month, and during November, new feathers are rapidly coming in, and the immature feathers of the head and neck are being replaced by others resembling those of the adult. On November 20th there is a black patch on either cheek, the chin dark-grey, the crown dark-brown and white intermixed, and the rest of the head and neck pure white. So far the only change in the plumage of the rest of the body is the influx of a few greyish feathers amongst the scapulars. On November 20th it is also not unusual to note a stray black feather on the lower chest. In the last week in November it is not rare to find immature males with whole of the scapulars grey and white, and the light brown patch behind the black patch on the cheek fully developed. Some also have numerous jet-black feathers on the upper breast and lower neck. The bill, too, assumes the pale colour of the adult. After December the winter plumage continues to advance slowly until the end of March, when the young male bears a resemblance to the old male, except that the black breast-band is incomplete, and the wings, back, and tail have not been renewed, but are faded and dull. In the first week in April the young male undergoes a full moult to the summer plumage, similar to the adult male, except that the wings and tail remain faded and worn as before. Another noticeable feature of the immature male is that the black breast is often only developed on the upper part of the chest, the lower remaining in the immature dirty-white plumage. In this half-changed plumage does the young male remain until the late part of July, when another full moult commences with a complete renewal of the wings and tail (the long central tail-feathers appearing for the first time) and breast and belly. From this date the plumage advances very slowly throughout August and September, when the young bird has an even darker appearance than the old male, but by the beginning of October the first adult winter plumage feathers on the head, neck, mantle, and scapulars make their appearance, all immature and eclipse feathers rapidly vanish, and the bird assumes its complete and first adult winter plumage about the middle or end of November. Thus the male may be said to reach maturity in seventeen months.

Adult Male.—Winter plumage: Cheeks, grey in front, passing at the back to a broad black patch, which on its lower front becomes light-brown; the rest of the head and neck immediately round the eye, pure white; above the eye, grey; back of the neck where it joins the mantle, grey, or greyish-white; mantle, back, tail-coverts, black; central tail-feathers very long and black; other tail-feathers blackish-grey, with white margins; wing-coverts, primaries, and broad band across the breast, brownish-black; flanks, white with a tinge of grey; belly and vent, white; the chin has a small dark-grey patch of feathers just below the lower mandible. On first assuming the winter plumage the male generally has the whole of the blackish-brown chest-band finely edged with greyish-white, but this edging wears off by December. Also, the cheeks and lores of many males come in white, only assuming the grey colour in November—a distinct colour change.

As is the case with many birds, there appear to be two very distinct types amongst adult male Long-tailed Ducks—a light and a dark one. The above description applies to the common form, namely, the light one. I have, however, seen many examples of a dark form which differs considerably from the foregoing. In this case the male has less light brown on the side of black cheek and neck patch. It is of a much darker grey on the back of the neck above the mantle and the scapulars. In addition there is a smoky greyish black edging and spotting to these feathers unnoticed in the light form. Both forms are figured.

Summer plumage: As early as the last week in March the adult male commences to assume its summer plumage, and in some early birds the parts of the plumage which are changed, consisting of the head, neck, upper chest, mantle, flanks, and scapulars are complete as early as the 20th of April, at which date I have killed males in full summer dress. Other males do not begin to change until the 8th or 10th April, and are not in full plumage until the beginning of May, at which date they have generally left our northern coasts. Only a few feathers are shed in the spring, from the lower breast and belly, and none from the wings, lower back, and tail. The secondaries fade to a much lighter and richer brown in April.

In the summer plumage a small space round the eye is buffish white; from the ear to the bill there is a patch of greyish brown; the rest of the head, throat, neck, chest, dark brown; mantle black; space between neck and mantle and scapulars rich red-brown, with black centres; flanks pure grey. The white crown of winter is always the last part to be moulted, and sits like a cap on the head above the shorter dark feathers of summer. There is often a considerable variation in the colour of the flanks. Generally they are of a rich pure grey, but in some instances they remain almost white, as in winter.

Specimens killed in the early part of July show the summer plumage to be the same as that of the spring but much worn and faded, but it is from this date until the middle or end of September that the plumage of the male Long-tailed Duck is full of interest, for my examinations of specimens during this period have led me to conclude that this duck passes into semi-eclipse dress before gaining the winter plumage.

Many authorities assume that by acquiring a new plumage at the beginning of summer the Long-tailed Drake passes directly into its eclipse dress. A close examination, however, of a number of males of this species, both in the flesh and in skins, in the months of July, August, and September has convinced me that this view is not altogether correct, for what may be called a still further change takes place in these months, and may with equal correct-

ness be called a semi-eclipse plumage. The result of my investigations on the change that takes place is as follows :—

During August the male Long-tailed Duck completely changes the wing, tail, back, and black portion of the mantle and black breast-band, these parts being replaced by the new winter plumage. The head, neck, and upper mantle, showing worn and faded plumage feathers, remain until shed at the end of September. The elongated scapulars are shed and not renewed until late September, but in late July a considerable number of new blackish and brown feathers come into the upper scapulars and mix with the old worn summer plumage feathers, whilst a number of new dark-grey feathers, similar to those worn by the Scaup, Tufted Duck, and Golden-Eye male in eclipse, come into the flanks and remain until shed again in early October.

The reason of this, I take it, is that since Nature abhors sudden changes of colour from dark to light, whilst the landscape is still under the warm colours of summer and autumn, the male Long-tail only renews those parts of its plumage to the full winter dress which are directly in harmony with its surroundings, adding, however, temporary feathers, as it were, to carry it over the three temperate months when it hides in the shadows of banks or rocky inlets. Thus all the dark parts of its plumage are renewed once, and once only, and the light parts which would be noticeable are delayed by a temporary makeshift until such a time as concealment is no longer necessary. In point of fact the winter dress of the male Long-tail, who lives amongst the white-lipped waves of troubled waters, is as suitable a dress from the point of view of assimilation to the surroundings as the rich dress of summer or the sombre black of autumn. I conclude, therefore, that it is not correct to call the brown plumage of April the "eclipse dress," but rather think that it should be known as the "summer plumage."

Length (including elongated tail-feathers), 22-26 inches; wing, 8.8 inches; bill, 1 inch; tarso-metatarsus, 1.25 inch; the beak at the tip and base black, the middle portion being of a red rose colour; feet, slate; webs, dusky-black; irides, hazel.

The top of the bill of the male Long-tailed Duck joins the skull in a somewhat peculiar manner. The highest point of the bill is extended slightly above the part of the long structure, and there is a distinct dip in the front of the crown, lower than the highest part of the bill, before it rises to the crown. Mr. Hugh Wormald, who first called my attention to this point, emphasises the fact that the top of the bill stands out clearly as a ridge above the feathers, but this can only be observed on close examination, and does not seem apparent in life.

Immature Female.—In first plumage the immature female closely resembles the young male, except that the colour is somewhat paler. They are also easily recognised by October by the incoming feathers of the respective sexes. In the case of the young female the advance of plumage is somewhat slower than that of the male, and she only obtains a few of the winter dress feathers. In April the greater part of the adult summer plumage is assumed, but there is little or no change on the back, breast, and lower parts, whilst the wings and tail are not shed at all until the principal moult in July and August. The young female then gradually assumes her winter dress, which is complete in October. She is thus adult at sixteen months, and will pair and breed the following summer.

Adult Female.—Winter plumage: Crown and hinder parts of the cheeks, dark brown;

rest of the head and neck, white; base of neck brown, forming a band round the neck above the chest and breast, which is sandy-brown; flanks, belly, and under parts, white; mantle, scapulars, and centre of the wings rich chestnut brown, with blackish-brown centres; primaries, blackish-brown; secondaries, rich brown with sandy edges; back, black, with sandy-brown edgings; tail, pale brown, inclined to sandy, short and sharp-pointed, a dark grey spot on chin; feet, slate; bill, slaty black.

I have seen several adult females in winter plumage—and possess one caught in the salmon nets at Buddon Ness, January 1883—which have a distinct *tendency* towards the male plumage. These are, like similar female Wigeon, not very rare, and it is possible that they are very old females. The one above referred to has almost a complete set of black feathers on the lower breast in the part where the male is black. The lower scapulars are tipped with greyish white, and the crown of the head, instead of being all dark brown, is brown intermixed with white.

Adult Female.—Summer plumage: The female in April moults the same parts as the male. The head and neck is changed from white to a very dark brown, except a space from behind the eye extending forward to the bill, which becomes a dull white tinted with brown and edged near the crown with sandy-yellowish brown; the lower chest is brown, edged with grey; nape and scapulars a richer red brown, with the black centre larger; a number of brown feathers appear on the flanks; the rest of the plumage is the same as winter. This plumage becomes much worn and faded in July, and a complete change takes place in August and early September to the full winter dress.

BREEDING RANGE.—This common species breeds practically the whole way from Bering Straits to Iceland, and from Greenland to the Aleutian Islands. In summer it is an inhabitant of coast lands in the Polar regions and those near to the Arctic circle.

Europe—British Isles: Orkneys.—Salmon is said to have found a nest which he took to be that of the Smew, but which may have belonged to this species (*V. F. of Orkneys*, p. 177). Mr. O. V. Aplin (*Zool.*, 1911, p. 432, and 1912; *B. Birds*, v. p. 203) says he has received news of the breeding of this species in Orkney in 1911, but gives only scanty details.

Shetlands.—Two eggs were given to Wolley in 1848. Saxby also records eggs said to be of this species (*B. of Shetlands*, p. 257); a nest with five eggs possibly of this species was found in 1887 (*V. F. of Shetlands*, p. 139).

Personally I do not trust any of the above records, and consider that very positive proof that the species has bred in the northern isles must be forthcoming before we can accept the fact that the Long-tailed Duck has bred there. I have seen many Long-tails in both those groups of islands in summer. I have been on many a “wild-geese” chase to take their eggs. Those journeys have always resulted in the supposed rarities proving to be some common species. It is quite possible the species will nest some day with us, and most likely in the Shetlands, where the character of the lochs and rivers is more like the Arctic tundra.

Faroes.—Colonel Feilden states that it probably breeds occasionally (*Zool.*, 1872, p. 325), and the late Mr. Müller assured me that a few pairs nested annually, and showed me specimens killed in late summer. Theobald also states that it breeds there.

Iceland.—Breeds abundantly at Myvatn and in many places along the north coast,

all recent travellers having found them there. I found numbers of Long-tails in the Fishivatn lakes in the centre of Iceland, but these were a few non-breeding adults and many immatures. Jourdain also found it breeding on Thingveller Lake in 1912.

Jan Mayen.—A few breed (Hantzsch, loc. cit., *Zool.*, 1890, p. 14).

Spitzbergen.—Not common but breeds sporadically, also on Bear Island (Le Roi, *Avifauna Spitzbergensis*, p. 227).

Norway.—Sparingly in Valdres and on the Dovre Fjeld; Throndhjem Amt (J. G. M.); Nordland and Finmark (Westerlund and Dresser).

Sweden.—Swedish Lapland; Finland and N. Russia; Russian Lapland S. to lat. 67° (Dresser), to N., Lake Onega (Dresser). E. Nordling has also recorded it as breeding in the Gulf of Finland (*Zeits. f. oologie*, 1904, p. 69). In N.E. Russia it breeds freely along the tundra from Archangel to the Petschora (Seeböhm and Harvie-Brown); Dresser says it breeds to Perm Government on east slopes of the Urals; and Sabanaeff that it nests in the Jaroslav Government; probably breeds in Kolguev, and commonly on Waigats (Pearson, *Beyond Pelsora*, p. 315); and Novaia Zembla (Pearson, Dresser, Von Heuglin, &c.).

Asia.—It breeds on the tundra on the coast across the continent to Eastern Kamtschatka. Also on the Commander Isles (E. W. Nelson, *Report*, p. 73); Aleutian Isles (W. H. Dall); Prybiloff Isles (H. W. Elliott).

N. America.—Breeds from Point Barrow, Alaska, to N.E. Labrador, throughout the Barren Grounds and down into the lakes of the Mackenzie basin as far as Bear Lake (Melvill); shores of the Arctic Sea north to lat. 82°; Herschell I., Parry I., Hudson Bay, Ungava Bay, Grinnell Land, and land to W. of Davis Straits. In the North-West it breeds in numbers on the coastlands and the interior of Alaska, and probably also in Northern British Columbia;¹ also nests in Southern Labrador (Hantzsch).

In Greenland it breeds in large numbers on the west as far north as Davis Straits. And Manniche (*Terrestrial Mamm. and B. of N.E. Greenland*, p. 97) found it a common nesting species in N.E. Greenland as far as lat. 80° 23' N.

MIGRATION RANGE.

Europe: British Isles.—This species is a common winter visitor principally to Scotland, the Northern Isles, the Western Isles, and the northern seaboard of England. Further south it occurs at intervals all round our coasts.

Orkneys and Shetlands.—They are numerous generally at the entrances of bays and voes and on the edges of tide-rips throughout these islands, more especially where there are mussel beds. They arrive about October 15th and generally depart during the last week in March. In some seasons when there are heavy north winds their spring journey is sometimes delayed, and they do not leave until they have assumed the full summer dress in the first or second week in April. I have seen a few stay until late in April and sometimes until May, but the latter are generally "pricked" birds.

Scotland.—Along the north coast of Caithness I have seen numbers from near Cape Wrath and Loch Erriboll to John o' Groat's, and they weather the winter storms of the Pentland Firth. Coming down the East Coast there are always a few off Wick. The water is too deep off the rest of the Sutherland coast until they come to Golspie Bay, where they are very abundant. I have seen immense numbers on a still winter day between

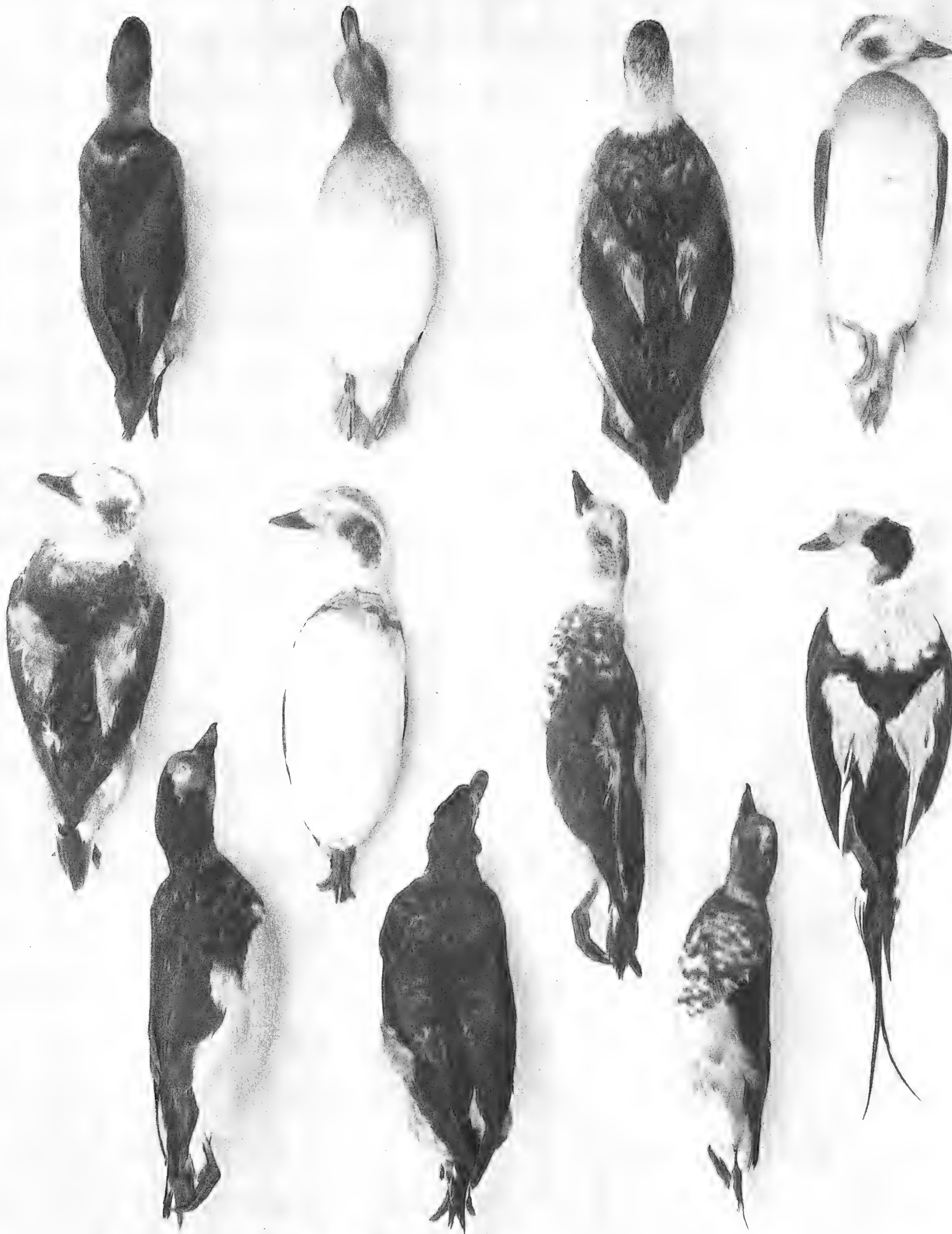
¹ In late September 1908 I found numbers of adults and young making their way down the Stikine River to the coast.

Golspie and the mouth of the Little Ferry, the whole bay a scene of noise and excitement with their merry calls and games. In hard winters they go a short way up into the Little Ferry. Next we come to the Dornoch Firth, about whose sandy bars they feed on the small cockles, but they do not come far up into the Firth, and we only find them on the true sea fringe at intervals along the east coast of Ross-shire. At the entrance of the Moray Firth we only find a few about Nairn and Forres, and they do not ascend this Firth beyond Fort George, but they are plentiful again all along the Banff, Aberdeen, and Forfar coasts. On the north side of the Tay estuary from Carnoustie to the Broughty Ferry Castle they occur in winter in great numbers, and I have seen over 2000 there in one day off Monifieth. Broadly speaking the Tay estuary seems to be the limit of the adults on the eastern coasts of our islands, for although parties of old birds may be found in winter all the way south to Norfolk, the flocks are usually composed of immatures. I have seen very few adults in St. Andrews Bay or the Eden estuary, where young birds are numerous. Off the entrance of the Forth immatures are also abundant, and I have seen a hundred and more in a day off Leith. Immatures are also found in flocks off Musselburgh, about North Berwick, and south to Dunbar. On the Borders they are regular visitors to the mouth of the Tweed, and flocks of adults as well as immatures are found regularly on the Northumberland coast about Holy Island and the Farnes. From this point southward a few, mostly immatures, are always found on the coasts of Yorkshire, Lincolnshire, and Norfolk. In hard winters it is an irregular visitor to the coasts of Somerset, Devon, and Dorset.

To the Welsh coast it is a somewhat rare winter visitor (H. E. Forrest, *Fauna of North Wales*, p. 290), but it again becomes more frequent on the coasts of Lancashire, Cumberland, and the Solway. The West Coast of Scotland is not suitable to its habits, but small flocks of adults are regular visitors to the islands of Iona, Mull, Islay, and Skye (on the west side). The species is abundant on the western coasts of N. and S. Uist and Harris, where I have seen considerable numbers, nearly all adults. On the west coast of Sutherland I have seen a few about the mouth of the Naver at Bettyhill.

In Ireland the species is an irregular visitor in small numbers, "and has been recorded more or less frequently from nearly all our maritime counties, but oftener from northern Ulster and the north coast of Connaught than from the south of Ireland, where it is rare" (*Birds of Ireland*, Ussher and Warren, p. 210). Mr. Warren has noticed a bird of this species in May on the Moy estuary, and Mr. Lloyd Paterson has seen three adults on Belfast Lough in the same month (*ibid.*, p. 211). Most of the examples killed in Ireland are immatures. In October 1856 Mr. Warren saw a flock of fifty birds, the largest number seen together in Ireland, in the Moy estuary, and considered that the species is not so common as it used to be (*ibid.*, p. 211).

Continental Europe.—In winter the species is very common on the whole of the coastal regions of the Scandinavian peninsula, Denmark, and Russia. They also assemble in great numbers in the Baltic and on the northern coasts of Germany, especially off the shores of Prussia, Pomerania, Mecklenburg, and Holstein, and the mouth of the Elbe. When the Baltic is frozen they move on to the North Sea, and are numerous on the west coast of Jutland. On the coasts of Holland and N. France they are scarce. Some few move as far south as lat. 40°, and are occasional visitors to the Swiss and Italian lakes as well as

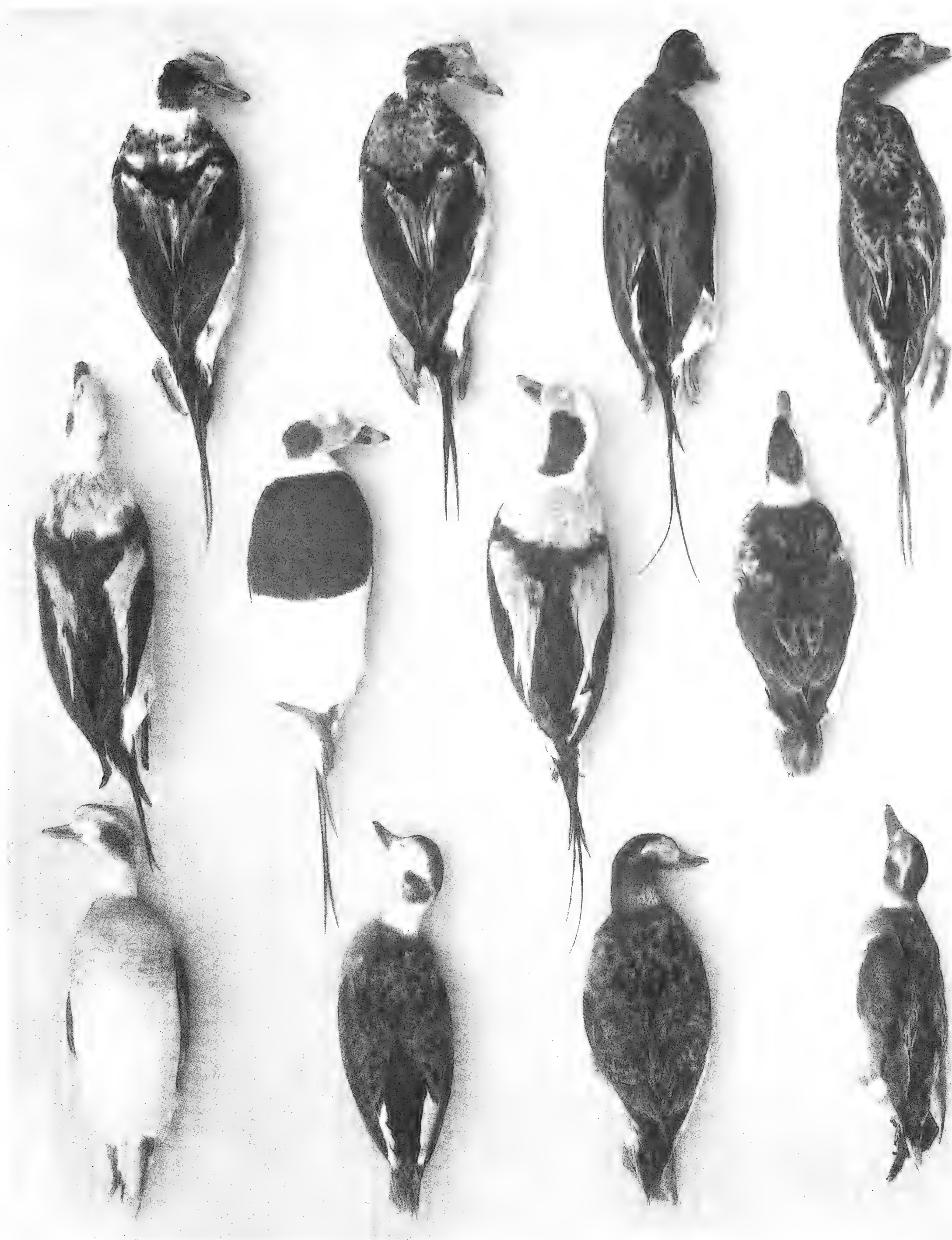


PLUMAGES OF THE LONG-TAILED DUCK.

Immature Males, from first plumage to maturity.

1. Young male. Iceland. Sept. 1st, 1909. Age, 2 months.
2. Immature male. Christianssand, Norway. Oct. 19th, 1905. Age, 3 months and 19 days.
3. Immature male. Leith, N.B. Nov. 20th, 1887. Age, 4 months and 20 days.
4. Immature male. Leith, N.B. Nov. 30th, 1887. Age, 5 months.
5. Immature male. Leith, N.B. Nov. 3rd, 1887. Age, 4 months and 3 days.
6. Immature male. Fort George, Nairn. Dec. 1st, 1890. Age, 5 months.
7. Immature male. Lynoes, Norway. Dec. 2nd, 1903. Age, 5 months and 2 days.
8. Adult male. Graemsay, Orkneys. Feb. 2nd, 1889.
9. Immature male. Husavik, Iceland. May 10th, 1911. Age, 10 months and 10 days.
10. Immature male. Husavik, Iceland. Aug. 2nd, 1909. Age, 13 months and 2 days.
11. Immature male. Husavik, Iceland. Sept. 14th, 1911. Age, 14 months and 14 days.

NOTE.—After No. 11, the bird will in the next month pass rapidly into adult plumage, as represented in Fig. 8.



PLUMAGES OF THE LONG-TAILED DUCK.

Adult Males and Immature and Adult Females.

1. Adult male; changing from winter to summer plumage. Stromness, Orkneys. April 3rd, 1886.
2. Adult male; changing from winter to summer plumage. Loch Stennis, Orkneys. April 15th, 1886.
3. Adult male; full summer plumage. Loch Stennis. June 25th, 1886.
4. Adult male; summer plumage, somewhat faded. Loch Stennis. July 3rd, 1886.
5. Adult male; changing from summer to winter plumage. North Iceland. Oct. 10th, 1911.
6. Adult male; full winter plumage. Little Ferry, Sutherland. Dec. 19th, 1885.
7. Adult male; full winter plumage (very grey type). Graemsay, Orkneys. Dec. 20th, 1885.
8. Immature female. Graemsay, Orkneys. Mar. 30th, 1886. Age 8 months.
9. Adult female; winter plumage. Buddon Ness, Forfar. Jan., 1883.
10. Adult female; winter plumage. Reisa Little, Orkneys. Feb., 1886.
11. Adult female; full summer plumage. Loch Stennis, Orkneys. May 2nd, 1886.
12. Immature female; plumage much faded. Holsteenborg, Greenland. Aug. 14th, 1909. Age, 12 months and 11 days.

the Adriatic (Saunders). It also winters in the Caspian (Buturlin). It is not recorded from Spain or Portugal, but has occurred in the south of France (Nîmes and Hyères; Dresser's *Birds of Europe*, p. 620).

Italy.—It occurs fairly regularly on the Venetian estuary, where over 100 were killed in October–November 1887, and was also common in 1891 and 1896, when Comte Ninni obtained thirteen in one day. Only accidental in the rest of Italy, in such districts as Lombardy, Ferrara, Liguria, Tuscany, Apulia (Arrigoni, *Manuale*). In Austro-Hungary it occurs in winter on the principal lakes and on the Danube (L. Velencze, &c.), and has once been taken in Herzegovina (Kadich). Not recorded from the Black Sea except as a rare visitor to Dobrogea (Dombrowski), but winters in the Caspian (Baku, Ménétries, *Cat. Raisonné*). Azores (*Nov. Zool.*, xii. p. 109).

Asia.—It occurs in winter from the Caspian to Lake Baikal. Also on the coasts of China (Taku, Swinhoe, *P. Z. S.*, 1871, p. 419). And Japan (*Ibis*, 1877, p. 147; *Birds of the Jap. Empire*, p. 252). Probably also northwards along the coasts of Saghalien and Ockotsch to the ice limit.

N. America.—Common in winter along the coasts of southern Labrador and the south and west coasts of Newfoundland, where I have seen large numbers in Fortune and Placentia Bays. On the east side of the continent it winters in large numbers from the Gulf of St. Lawrence to North Carolina and the Great Lakes. It is found south to lat. 37° (Saunders) and is only of casual occurrence in Florida (*Auk*, 1888, p. 319); Louisiana, S. Carolina (*Auk*, 1888, p. 203), and in Gulf of Mexico (Hantzsch). On the western side it winters in the Aleutian Islands and along the outside reefs of Alaska. Very abundant in British Columbia, Washington, and the N. coast of California in winter, but becoming scarce in the south. Numbers of Long-tailed Ducks winter in West Greenland.

HABITS.—Long-tailed Ducks leave their northern homes on the first signs of rough weather in October, at first in small parties, but later in larger numbers. The southern migration is, as a rule, gradual, but continuous throughout late October and November. It is rare to see more than a few small parties in October, but by the end of November large flocks assemble in the Baltic numbering from three to five hundred, whilst in the British Isles, especially on the north-east of Scotland, an equal number may be found, but not in such close flocks. On Continental coasts the pressure of ice forces these birds to assemble in immense numbers about the mouths of rivers, but with us the conditions are seldom so severe in our islands as to make them leave their regular winter bays and voes. Their advent from November to February, to the freshwater lakes and rivers of Central Europe, is therefore more a matter of necessity than choice. With us they seldom leave the sea, and I have only seen them in brackish waters on rare occasions, and then in spring when about to leave for the summer. In North America, with a free seaboard on either coast they keep just below the ice limit on the eastern side, but go much further south on the west, occurring in large numbers on the coasts of S. British Columbia, Washington, and N. California, where the winter conditions are very mild.

It is somewhat curious that a bird like the Long-tailed Duck, which is found, as a rule, in summer on fresh water, should in the winter be so devoted to the sea, but no doubt the nature of their favourite food, molluscs and shell-fish of all kinds, is responsible for this, and where these are to be obtained they show no disposition to roam, being found day

after day at the same hours in the same spot. When I used to shoot regularly in winter from Stromness in the Orkneys, I could always sail my boat directly to flocks of Long-tailed Ducks had I the mind to do so, and they were always feeding, generally at low water in the same tide-edge, about the same place. No amount of disturbance from shooting seems to teach them caution or to make them change their habits, for by nature they are confiding and easily approached. In November of 1891 a flock of about eighty immature Long-tailed Ducks took up their station about 300 yards to the north-east of the walls of Fort George in Nairnshire. I fired twice at them and killed six, which was all I required, and throughout December-February the officers and soldiers bombarded them regularly with gun and rifle until there were only some half a dozen left in March, and the remnant could always be seen about the same spot and in the same compact bunch till they left in the end of that month. By day adult Long-tailed Ducks are merry, restless creatures, constantly flying and calling to one another or diving in the shallows near the rocks or mussel banks. They often approach the shore, and I have several times killed them by "running-in" on a flock and surprising them as they rose to the surface. Especially was this the case in the bay near Dornoch where I spent the month of December 1892. Here they would even feed on a lee shore where large breakers were dashing on the rocks. In such places they showed their wonderful skill as divers by always taking a header and passing through the wave just as it was about to descend upon them. They seem to have a sure instinct of the wave that will break and the wave that may be safely mounted, and I never saw one make an error of judgment. At twilight they took to flight and resorted to the open waters of the bay, being active all night and in the dark hours of early morning, as one could hear by their merry cries. They seem to have the greatest dislike to flying over land, however narrow the strip, and never fly high either on the sea or over the rivers and lakes of their summer homes. I have stood on the Bridge of Waithe at Loch Stenness, the only obstacle they have to cross between that brackish lake and the sea, and waved my arms at a flock that was approaching, yet they never flinched or tried to avoid my presence by flying over the necks of land on either side, but came on until they passed within a few yards. On the tortuous streams that flow into the Myvatn Lake, too, they will pass the intruder within a few yards rather than fly over the smallest projection of land.

When resting the Long-tailed Duck sits very low on the water, with head more buried between the shoulders than any other species, and will drift or keep slowly paddling on the edge of the current or out in some quiet bay for hours without moving far. When alarmed the head and tail are both held up perpendicularly, and the males generally begin to call. If there is any swell they rise fairly easily, beating their long-pointed wings very fast, and looking somewhat like a Razorbill or Guillemot. They generally rise in a line, turning the body with quick changes from side to side, and seldom performing a flight that takes them directly away from the observer. Whether from curiosity or the habit of flying in semicircles they usually swing inwards towards an approaching boat, and thus give a gunner ample opportunity for shooting at them. This constant habit of swinging from side to side, showing first the breast and then the back, enables the spectator to recognise them at a great distance, and this, added to the fact that one male at least is constantly calling, renders them easy to identify. If suddenly alarmed and one part of a flock is already on the wing, the others, as they rise to the surface, will

open the wings before the rest of the body is out of the water. They fly low over the water, and in spring, especially when pairing is commenced, are the most restless and energetic of all ducks.

Both adults and young fly in irregular flocks as well as in Indian file. They alight somewhat abruptly in the water, and I have often seen them, especially in spring, literally fall into the water with closed wings from a height of several feet, sending the spray flying. They are happy-go-lucky little ducks, and seem to have a certain dashing abandon in their movements which shows confidence in their own skill in water or air. I have several times seen them fight in mid-air and go rolling in the sea, dive, fly right out of the water, and continue the chase till one or the other gave in.

It is said that on mild days in spring and autumn Long-tailed Ducks will collect in large flocks and fly so high in the air as to be scarcely visible, and then descend to the water with a rush that can be heard from a considerable distance. I have never observed this habit in the species, though it is common enough in Golden-Eye, Scaup, Tufted, and Pochard. This "towering"¹ is described by Mr. George Mackay in the *Auk* (October 1892), and other American writers.

The call of the male of this species has been rendered into words in different ways, and in some localities this gives the bird its name. In fact the American name of "Old Squaw" is the synonym of garrulity. "Honk, Honk-a-link," "Calloo," "Curl-wee," and "Coal-and-Candle-light" are all onomatopæic titles. In Russia and Siberia the bird is known as "Col-gò-y." In America, as well as the common name, it is known as "Cock-a-wee" and "South-southerly." The cry always seems to me to be like the syllables "Ca-Ca-Coralwee," and often the "Cā-Cā" is given before the full notes. Whether on the still sunlit waters of the bay or rising above the crash of the loudest gale, the cry of this gallant little sea-rover is always delightful to hear, whilst it brings back memories of snow, ice, and rough weather so dearly beloved by the wild-fowler. Once or twice I have sailed right in amongst a large flock of these birds, and the calls of all the males crying at one time had quite a musical effect. It is only very rarely that the wild-fowler has an opportunity of approaching a large flock of these ducks in the gunning-punt, which is by far the best shelter in which to note the habits of wild-fowl, owing to the exposed nature of their habitat; but I have on several occasions, when the weather has been calm, been right amongst them before they have detected my presence. When on feed they are extraordinarily unsuspicious of danger, and knowing this, I allowed my punt to drift into a flock of about fifty. The bay of the Eden was a sheet of drift ice and quite calm, so that there was not much danger in going off-shore to the feeding flock, which came up all round my boat, so close in fact that I could almost have touched one bird with my gun as it stared into my eyes. I drifted right through the flock, and they did not rise until I sat up and showed myself.

If you watch a flock of these ducks feeding off-shore you will often see them in a long line parallel to the coast. The diving of the bird at the extreme end is the signal for the rest to follow in regular succession, never all at once, and seldom more

¹ "It is remarkably strong in flight and alights on the water with a hard dash, making the water fly for many feet. It also ascends to great heights as it flies from one locality to another, if distant" (*Contributions to the Nat. Hist. of Alaska*, p. 134, by L. M. Turner, 1886).

than two or three at a time. In diving, the head is first thrown well back and then plunged forward; the open tail and its two long feathers being thrown over till they touch the water on the other side. A wave of water is thrown up as each duck disappears. They remain under water and usually come up close to one another. Then they make their cheery calls, swimming rapidly to and fro with tails lying open on the surface or below the surface of the water,¹ again make ready for another dive.

When feeding, Long-tailed Ducks seem capable of diving to a greater depth than most of the genus except the Eider, the Scaup, and the Velvet Scoter. Usually their feeding grounds are in ten to thirty feet of water, and they seem able to remain below in considerable currents. The whole flock sometimes dive together, but more often in twos and threes, leaving no sentries on the surface, and usually remain below from half a minute to one minute. In diving they use the feet only, and turn and twist to avoid sea-weed with great skill. Often they descend to the bottom in spiral curves. Their principal food in winter is *Conchilia*, both monovalve and bivalve, particularly *Mytilus edulis*, *Cardium edule*, and *tellina cornea*. They also devour small crabs and fish. In the Orkneys and Shetlands and on the East Coast of Scotland their food is generally small common mussels, but on the Dornoch Sands I have found their stomachs full of small cockles and crabs. In summer they eat largely the roots, seeds, buds, and young shoots of various water-plants as well as insects and worms, but this diet seems to be more eaten by the young. In the winter it is difficult to drive Long-tailed Duck away from their regular feeding haunts, and they will return again and again to them in spite of constant shooting. I remember one afternoon in December 1887, when in a small launch in Leith Bay, the Long-tails kept on coming in from the sea the whole afternoon. After being shot at they went out to sea and returned again in a few minutes. I have never seen so many Long-tails, all immatures, in the Forth estuary as on that day, and they seemed quite callous of shots fired at them at close range. As a rule their winter feeding-grounds are situated on the open sea itself, but during severe weather and in north-easterly gales I have seen large numbers come up the narrow estuaries of the Eden in Fife and the Little Ferry in Sutherland. One winter day in 1892 the whole of the flock of birds in Golspie Bay moved in small parties up the narrow neck where the tide flows from the Little Ferry into the sea, and some hundreds passed within easy gun-range in the course of a couple of hours. They flew low over the water and alighted in the swift tideway, about 200 to 500 yards, in the land-locked firth, where they at once commenced feeding. The stream was so swift that they could only make a few dives before being forced to fly up stream again to reach the mussel beds. Had I wished to do so, and could my dog have borne the strain of retrieving from the tide-race, I could have killed a very large number that day, but after shooting four adults I left them alone. In the Iceland rivers, where they seem to get most of their food (small freshwater mussels and fish) by diving, they are extraordinarily tame. At my camp by the Myvatn farm-house on the bank of the Skalfandi Laxa there was a pool in the river situated not twelve yards from where we sat, dined, or skinned our birds, and here were always five or six male Long-tailed Ducks and an occasional Barrow's Golden-Eye feeding at all hours, quite unconcerned at our talking and movements. When feeding

¹ I noticed Mr. St. Quintin's birds always opened the tail when about to dive for food.

the Long-tailed Duck keeps the body very low in the water, often with the tail out of sight and water washing over the nape. It is a very "busy" duck when searching for food, and keeps on diving with few rests. On the Baltic, when forced to resort to deeper waters owing to the ice blockade, they can obtain food at a depth of 30 feet, but this has a serious effect on their condition and they soon become thin, whilst Blasius (*Neuer Naumann*) says it has been proved that they can dive to a depth of 14 metres, but they seem incapable of reaching to such depths as the Scaup, the Eider, and the Velvet Scoter, which can obtain food at a depth of 20 metres and are not distressed in so doing.

Provided there are no severe north or north-easterly winds in the latter part of March, the Long-tailed Ducks assemble in large flocks and migrate north to the breeding grounds. A few warm days is sufficient to make them very noisy and restless, and in two or three nights they are gone. It has been my good fortune in the springs of 1885 and 1886 to find the flocks of these birds blocked by northerly winds, which in 1886 continued to the end of the second week in April, and to observe the gradual advent of the summer plumage until in some cases it was quite complete, and to witness the courtship of these beautiful birds. If the Long-tailed Duck is "merry and bright" in winter, it is doubly so in the spring, when all the fire and romance of sexual instinct is aroused. There is no sight more charming to the naturalist than an Orcadian bay in spring. From the vivid green of the hills come the wail of the Golden Plover, the cheery calls of the cock Grouse, and the monotonous "Pee-wits" of the Lapwings. On the golden green foreshores the Redshanks and Ring Plovers are making gentle love in plaintive tones, and the Oyster-catchers are yelling defiance to all and sundry. Herring Gulls and Lesser Black-backs keep up a chorus of yelping cries of joy, whilst a pair of Great Black-backed Gulls occupy some prominent headland and utter an occasional "Wau." The bay itself is gay with moving life in the shape of Red-breasted Mergansers, Puffins, Guillemots, Black Guillemots, Shags, and Cormorants, flying or diving in search of food, and above all rises the musical notes of the cock Long-tails, who are to be seen in various stages of changing plumage, rushing, flying, quarrelling, or massing in extravagant postures round some favoured female. It is a gay and beautiful scene, often so still that in spite of tides and sudden rises of wind I have more than once ventured to intrude my presence in the double-handed gunning-punt, so that I could achieve a greater intimacy than is allowed to the more ostentatious sailing-boat. None of these birds seem to have any fear of the punt except the Mergansers, and so the observer can get close to and watch all that is to be seen. The opportunities for observing the courtship of the Long-tailed Duck are, however, few in our islands, owing to the fact that these birds, so tame at other seasons, become extremely wild a day or two before they depart, and most of the flocks are unapproachable either by sailing-boat or gunning-punt. I have, however, been twice right amongst a courting flock and watched them closely.

As previously stated, the actual courtship of the male is generally aroused and brought about by the sexual desire of the female, and amongst ducks the females are very irregular as to the time of their coming into season. Thus only one or perhaps two females in a large flock may be well advanced in their summer plumage and their breeding instincts, and these are the special objects of desire of all the males. I have noticed a bunch of eight or ten females swimming apart and not a male going near them, whilst ten or fifteen males will crowd round some particular female and lavish upon her all their arts of charm. The

most common attitude of the male in courtship is to erect the tail, stiffen the neck to its fullest extent, and then lower it towards the female with a sudden bow, the bill being held outwards and upwards. As the head curves down the call is emitted. Sometimes the head is held out along the water before the female, who herself often adopts this attitude, or makes a "guttering" note of appreciation with head held in close to the body. Another common attitude of the male is to throw the head right back till it almost touches the scapulars, the bill pointing to the heavens. As the bird throws the head forward again the call is emitted. Many males will closely crowd round a female, all going through the same performance. It is not long before a fight starts amongst the males, so that the lady of the tourney is in the midst of a struggling clamorous mass of squabbling knights, each endeavouring to show his qualifications to love by his extravagant gestures or strength. To add to the confusion, any male Long-tails in the neighbourhood are sure to hear the noise and come flying in all haste to take part in the jousts. Even males still in full winter plumage will come and be almost, if not quite, as active as the rest. They advance with all haste, swaying from side to side, their sharp-pointed wings being only arrested when almost above the contest. Then they close the wings in mid-air and dash into the fray with all their ardour. So impetuous and gallant are males of this species that they will chase each other for long distances, falling often in the sea and sending the spray flying; down they go under the water and emerge almost together on the surface to continue the chase in mid-air. I have twice seen a male when flying seize another by the nape and both come tumbling head over heels into the sea in mad confusion.

The longer the birds remain the more fierce become the love-fights, as more and more females show their disposition towards mating, but any cessation of the north winds and rise of temperature at the beginning of April makes them migrate. Two fine days, at this time, cause all the West Orkney birds to leave the inner bays and carry on the love-lists in the open sea towards the Black Craig, and the next day they are away to Iceland, Greenland, and the Russian tundras. Sometimes a small flock may be left behind for another week, but these are generally unapproachable, and any that remain in the northern islands until May are generally wounded birds. I have killed a pair in May, and have another shot by my boatman in June.

Long-tailed Ducks arrive in Iceland, generally from the 10th to the 20th of April, in large flocks, which seems to be about the same time as they come to the nesting grounds in Russia, Siberia, and some weeks earlier than in Arctic Canada and Greenland. They continue their courtship for a short time, and soon pair and distribute over the small and large lakes and slow-moving rivers that are situated near the sea-coast, though this is not always the case in Arctic Canada, where they go great distances up the rivers and lakes inland. Even in Norway and Finland they nest in fresh waters far from the coast. But wherever the species nest, they choose a position that is connected with the sea by a system of rivers and lakes, so that they are able to lead the young down-stream in the autumn. It is said that in the choice of her nesting site the female is very quarrelsome, and does not permit the approach of other species, but I think this cannot always be the case, for I found a nest at Myvatn in dwarf willows almost beside that of a Common Scoter, whilst several were noticed in cracks in the lava on the river banks, very close to the nests of Scaup. Shepherd and Ussher also record this species and Scaup sitting on a joint nest. I found

that most of the nests of the Long-tailed Duck were placed in scrub willows, either close to or at some short distance from the waters of the lakes or rivers in Iceland. They also nest on high banks amongst rough grass, on the banks of lakes and rivers, and on islets. Seebohm and Harvie-Brown describe the nesting sites as generally situated amongst the vegetable debris on islets near the sea. Nests such as I found were merely hollows, fairly deep, sometimes lined with dried grass or tufts of heathery *empetrum*, at others only lined with sooty-brown down with whitish spots. Hantzsch describes the down as "pale-brown," and Dresser "dark sooty-brown with dull white spots" (see also descriptions in *Zoologist*, 1906, p. 373, and *British Birds*, ii. p. 39). The nest is sometimes well concealed, at other times somewhat exposed in cavities amid stones.

It is interesting to note the variation in the nesting materials and coloration of the down of the different species of these Arctic-breeding ducks, as each and all are so distinct, and are a useful point in the identification of the nests of the various species which may be of use to the young collector. Wigeon: nest-lining grass and leaves, down, not very abundant, ashen-grey; Barrow's Golden-Eye: down mixed with small parts of dry plants, down abundant and whitish in colour; Long-tailed Duck: down sometimes mixed with fine dry plants and leaves, down sooty-brown with whitish spots; Scaup: down mixed with coarse plants and grasses, down very dark brown; Black Scoter: lined with coarse plants, down grey-brown; Red-breasted Merganser: lined with coarse grass or plants, down light ash-grey.

Mr. H. J. and C. E. Pearson (*Ibis*, 1895, p. 244), in describing nests found in Iceland, say:—

"We found eggs from June 18th to July 20th. Most of the nests were to be found on islands. On July 20th we drove a bird from a nest with six eggs, and this nest was situated several hundred metres from the water, on the bare slope of a hillock, and on black sand. Down was the only material in the nest, and the dark colour of this provided complete protection for the nest if the duck covered the eggs with it. Not one of the many nests noticed by us was placed in a hole, but they were frequently in a cavity between two hillocks of grass. In this neighbourhood the exterior of the nest was always made of grass, and the bird covered the eggs with grass if she left them; they were often successful in making a very deceptive imitation of an old nest. The only safe plan is to thrust the hand deep into the nest whether it looks old or new."

The usual number of eggs is 5 or 6 to 9, and rarely 10, and they are in shape elliptical or blunt oval, with a glossy shell; the colour is pale greyish-green, ranging to buff or brownish-buff.

Late in May or early in June the first eggs are met with, and our party in Iceland ate fresh eggs on July 2nd. Seebohm took eggs on the Petschora and on the Yenesei at the beginning of July, and Pearson says June 20th to July 18th is the nesting season. Nevertheless a few hatch out early in July, for I saw two females with newly hatched young on July 3rd in the Skalfandi River. Incubation is performed by the female alone, with the male in constant attendance until the young are born. Hantzsch gives the period of incubation as three and a half weeks.

When first paired, and until the male deserts the female in July, the sexes are much devoted to one another, and go through lively expressions of joy when meeting on the female leaving her nest. If danger threatens they will not leave one another, and the male

will not fly away if the female is shot, but even if flushed to wing he will return and meet a similar fate. The Esquimaux and Siberian natives kill large numbers in spring, owing to their tameness and affectionate nature.

Riemschneider (*Ornith. Monatsschr.*, 1896, pp. 314-16) gives a very interesting account of the intense sexual excitement on the part of male Long-tailed Ducks during the early part of the breeding season at Myvatn:—

“The ice-duck appeared in largest numbers at Skutustadir, though they were common too in the other breeding-colonies on the Myvatn. By day and night could be heard the beating of the wings of the *Havella-Erpel* at the windows of my lodging in the parsonage, and the panes were often touched by their wing-tips. The sounding call of these creatures was continuously to be heard, a sounding “*a, ang, angliss*,” moving by thirds from low to high, if one could employ a musical notation to describe the cry of a bird. The male ice-duck were altogether in such excitement as I have never known any other species to be in, even if they had to experience a check owing to some intervening cold days, but this continued even into the first days of July, only gradually ceasing on the beginning of the summer moulting. Calling, beating the water with their wings, or rising noisily into the air, the male of the ice-duck took a considerable share in the many-voiced concert of birds, which only lessened slightly at the sun-bright midnight, without ever becoming quite silent. But if a female duck appeared, if it had left its nest only for a moment, then immediately a company of drakes appeared too, and they pursued her with their attentions, unwilling as she was, in a most persistent way, though she may only have been a female of the *Fuligula marila* or some other species. At such a time the sex-excitement of the *Hiemalis* males reached its highest point, as could be seen from the marvellous position which they assumed. Steering with its two extremely long glory feathers, the duck raised the latter so that they waved obliquely in the air; and whilst the male uttered its call, the head and neck were thrown back so much that they almost touched the back, and the beak was held in a vertical position.

“I have seen the ice-duck go through this manoeuvre in flying; less experienced naturalists might then consider this bird as belonging to anything rather than a species of duck.

“The females were still busy over the breeding in the second half of June, although it appears that the ice-duck begins to sit earlier than the other species here, for I saw a nest as early as June 22nd in which there was a young bird just hatched, half bare, together with two eggs of which the shells were cracked; another nest in which there were some young in process of hatching. The female flew away from such nests only when you stretched out a hand to get her. On June 25th I saw a female leading seven young at the down stage, and after that mothers leading their brood were to be seen every day. When I left the Myvatn in the beginning of July there were only a few ice-duck still sitting on eggs.

“I have only noticed the soiling of a sitting when the mother flies off as an exception with the ice-duck.

“The outside date of arrival of the ice-duck in spring 1895 was given me as April 20th.”

I watched a newly-hatched brood of Long-tailed Ducks one day for a long time, and noticed that they took very little food for themselves. They caught a few flies, but most of their food was obtained by the mother diving incessantly and bringing up substances from the bottom and placing it before her brood. When she appeared they all kept up a gentle “peeping” sound, and kept close together in a bunch, seldom running to catch flies as other young ducks do. After watching these birds for some time I wandered up the river to the Lake of Myvatn to look at a Scoter’s nest, and on returning witnessed the attack of two Richardson’s Skuas, a black and a white bellied one, on the same brood of Long-tailed Duck. The method of attack was exactly the same as I have seen employed by Carrion Crows in Hyde Park. One Skua swooped down and distracted the mother’s attention to one side by hovering over the water. The anxious parent opened her bill and

gave a series of grating calls. As the marauder came to the level of the water, the Long-tailed Duck with raised crest made a fierce rush of a few yards at it, and in this short space of time the second Skua swooped down, picked up a nestling and swallowed it alive, head first. The frantic mother then darted in the other direction, when the Skua that had first attacked nimbly picked up a duckling and swallowed it whilst mounting into the air. These Skuas, which are plentiful at Myvatn, must commit considerable havoc amongst the very young ducks, and doubtless constitute their chief enemies. Mr. Manniche, whom I had the pleasure of meeting in Denmark in 1911, tells me that the Glaucous Gull is equally mischievous in destroying the young of Long-tails and King Eiders in East Greenland, and probably Buffon's Skua is another successful pirate.

During the earlier stages of growth the young are kept by the mother in the sheltered waters, and there is no perceptible move for the coast until the middle of September, when the parties of females and young head down stream for the coast. Most of the males in parties leave early in September, and at the end of the month join up with adult females prior to migration. In Germany it is said that the old males join the family parties and arrive with them, but in the British Isles adults and immatures are clearly divided on arrival, the old birds going to certain firths and bays, and the young to other habitats. Only here and there do birds of different ages overlap and occupy the same winter ground. In the Baltic it is certain that large numbers of all ages are found together in winter, but this is due to forced conditions, resulting in curtailed feeding grounds. The general migration from the Arctic regions is somewhat governed by the season, whilst a certain number of Long-tailed Ducks always remain in Iceland, Greenland, Alaska, S. Labrador, and North-western Scandinavia, just below the ice limit. On the west coast of Norway Long-tailed Ducks are often abundant in late October, but as winter sets in these move down gradually to the milder waters of S. Norway, Denmark, and Holstein.

Of the arrival, migrations, nesting habits, and departure of these ducks in the neighbourhood of Point Barrow, Alaska, we have an excellent account in the *Report of the International Polar Expedition* (p. 118).

"This was one of our commonest ducks, though never appearing in great flights like the Eiders. They are first seen about the middle or end of May, and remain as long as there is any open water in the fall. The seal-hunters in 1882 reported seeing these birds as late as December 9th, in open holes in the ice-field.

"Though the first ones arrive from the 15th to the 20th of May, they are not plenty till the first week in June, about which time there is a considerable flight, larger flocks passing up to the north-east in the afternoon or evening.

"The flight-flocks are never so large as the flocks of Eiders, and always go very high, making a great clamour. They are exceedingly noisy all through the spring migrations and the breeding season. The native name 'Ahadlin' is a capital imitation of their ordinary cry.

"After this flight they are to be found in tolerable abundance in all the ponds and pools on the tundra which are free from ice. They appear to have paired before their arrival, and only seldom collect in small parties at some favourite feeding ground like the 'goose pond.'

"During the breeding season each pair seems to adopt a pool for its own, and drive out all intruders. At this season they feed almost exclusively on vegetable food, and are fat and in excellent condition for food, with no fishy flavour.

"They breed in considerable numbers all over the tundra, but the nests are scattered and not easy to find. The nest is always lined with down and generally near a pool.

"As the open holes begin gradually to form at the outlets of the lagoons, and along the beach, the

Old Squaw resorts to them in increasing numbers, frequently sitting on the ice. By the first week in July they begin to abandon the tundra and collect in large flocks along the shore.

"After the ice has broken up and gone away they are to be looked for especially along the shore, although a small party is generally to be found in each of the large lagoons. Through July and August they vary in abundance, some days being very plentiful, while for two or three days at a time none at all are to be seen. At this season they fly up and down not far from the shore and light in the sea. Towards the end of August they are apt to form large 'beds' near the station, and this habit continues in September whenever there is sufficient open water.

"Many come from the east in September and cross the isthmus at Pergniak, and continue on down the coast to the south-west. We noticed them going south-west past Point Franklin, August 31, 1883, in very large flocks.

"After October 1st they grow scarcer, but some are always to be seen as late as there is any open water.

"They begin to lay about the middle of June, and downy young were found July 20th."

The principal enemies of the species are the cowardly White-tailed Eagles, who kill numbers of half-grown young and wounded birds, the Greenland and Iceland falcons, the three Long-tailed Skuas, and the Great Black-back and Glaucous Gulls. Arctic foxes and Polar bears also account for a good many before they can fly. Naumann details the following formidable list of parasites that affect the entrails of this species: "*Tænia teres*, *Tropidocerca inflata*, *Spiroptera crassicauda*, *Trichosome brevicolle*, *Echinorhynchus polymorphus*, *Distomum ovatum*, *Distomum concavum*, *Distomum globulus*, *Distomum brachysomum*, *Distomum pyriforme*, *Monostomum alocatum*, *Monostomum attenuatum*, *Holostomum erraticum*, *Notscotyle triserialis*, *Tænia groenlandica*, *Schistocephalus dimorphus*."

This is one of the easiest of the sea-ducks to shoot with the shoulder-gun, for adults, especially when they first arrive, are easy to approach in an open sailing-boat. When viewed on the sea, if the birds are to windward, they will permit a boat to tack many times at fairly close range until it is well above the wind. When down wind they can be approached with some degree of certainty by sailing directly to the flock, which only shows its intention of rising when the boat is within seventy or eighty yards. The birds then elevate the head and tail, and even then often hesitate until the boat is within thirty yards before taking the wing. Then they pass, calling as they fly to right or left of the boat, offering an easy chance. They are not difficult to kill if hit well forward, but winged birds, especially in a lumpy sea, are always difficult to recover. I have often seen Long-tailed Ducks, after swinging away on a side wind out of shot, make a tack again in towards the boat, thus offering chances that were at least unexpected. This is particularly the case if one of their number has by chance come near the boat and been killed. They seem to have more curiosity, tameness, or sympathy with their own species than any of the sea-ducks, and for this reason can easily be shot over decoys amongst ice-floes, a practice for killing them which is much in force in Finland, the Baltic, and the north-eastern coasts of America. "On the coast of Åland," says Mr. Dresser (p. 622), "vast numbers are shot by the peasants, either by watching for them near the open spaces in the ice, or by putting out stuffed decoys." "It is not very unusual," writes Dr. Sundström (quoted by Dresser, p. 622), "for one peasant to shoot in a single spring 300 or more Long-tailed Ducks, besides Eider, Scoters, and other ducks; and at one peasant's place called Klåfskär, where this bird is very numerous, the peasant has shot as many as 600 to 800 in one spring, all



- J. M. Lewis. 1912

Walter L. Collis, Sc.

Courtship of the Long-tailed Duck.

being killed with a pea-rifle. Some of these would be eaten directly, but most of them are salted down for future use."

There seems no reason why numbers like this should be killed in this country, for these ducks are as unpalatable as other sea-ducks, and only a few are required by the naturalist wild-fowler. Yet I know of two places where a very large number of these ducks could be killed in winter over decoys.

On the east coast of North America numbers of these ducks are shot to decoys, and calls are made to attract them. "These birds are easily decoyed," says Leonard Sanford, (*The Waterfowl Family*, p. 156), "and, by imitating their note, are often turned from their course and called in. They drop among the stool with a sociable grunt. You wait for them to rise, but they may think differently, and just disappear, coming to the surface and taking wing out of range."

The behaviour of young Long-tailed Ducks when they first arrive in these islands, and even for some weeks afterwards, is altogether different from the adults, and the fact that they will not rise to wing, but prefer to escape by swimming away and diving, shows a curious difference of habit from any other species. When first viewed, a flock of immatures appears to be very dense. They swim almost touching one another, and if a "family" shot is obtained by the pot-hunter, it may cause great execution. When approached within twenty yards and fired at, the flock either dives or separates singly or into small parties, which again break up and scatter. Once thoroughly alarmed, these immatures take good care of themselves, but their somewhat unaccountable habit of not taking to wing is all the more remarkable since they are fully capable of flight after their long journey from the north. I have noticed this "bunching" habit of the immatures to continue throughout a whole winter if the flock find suitable feeding grounds, and, as far as I could observe, I never saw the Fort George flock, previously referred to, once take to wing the whole autumn or winter, either of their own accord to change their feeding ground, or to avoid the gunners who frequently attacked them.

This habit of theirs, however, may be solely induced by local conditions, for the birds may have found that there are no other suitable feeding grounds in the vicinity, for on the other hand I have, both in the Forth and Eden estuaries, seen immatures in January coming in all day from the open sea and flying past the outer mussel banks to some river bays, where they found their food. All Scandinavian, German, and American gunners, however, agree as to the tameness of this species, and the ease with which young birds may be shot amongst ice, or when passing necks of land on their way to feeding grounds. Winged birds of this species are not easy to recover unless shot again after the first dive, but they tire sooner than either Eider or Scoter, and can be obtained with perseverance. If otherwise wounded they often get into the sea-ware at the bottom and amongst floating kelp and are lost.

Large quantities of these ducks are caught in the shallows of the Baltic and the North Sea and in the estuaries of rivers, in large wide-meshed nets stretched in squares on stakes, in a horizontal position, below the surface. They are also sometimes caught in the large loose nets set for fish and hanging vertically in the water, and I have seen them captured in the salmon nets set in the Buddon Ness (Forfar) and Tents Muir (Fife) coasts. Many thousands of these ducks are captured in the waters round Fehmarn and the Bay of Neu-

stadt by vertically placed decoy-lines called *Battand Dorschgarne*. Near Kiel, too, thousands are sometimes caught and shot in winter, and after supplying the neighbourhood are sent in waggon-loads to Hamburg and other towns, but the birds are not now so plentiful as they were.

Mr. St. Quintin has been so fortunate as to possess a pair of these ducks, which I had the pleasure of seeing in good health in May 1911. Mr. A. F. Moody has kindly sent me some interesting observations of these two birds:—

“I am acquainted with but one example of this species, a female, that has thriven here since February 23, 1909. It is a happy and hardy little bird, and of the various water-fowl that we possess is undoubtedly one of the most interesting. In appearance it differs greatly from any other duck, and is conspicuous chiefly by its pied plumage and the flat appearance that it presents upon the water.

“Regarding its habits, it rarely leaves the water any distance, and although exceedingly tame it is only very occasionally that it will allow itself to be enticed some ten or fifteen feet from the bank to be fed. It is then noticeable that it walks in an upright Guillemot-like attitude, so much so that it greatly reminds one of that bird, and when putting its head to the ground it appears to experience some difficulty in retaining its equilibrium, and frequently ends by lying down to eat. On the water it is of course an expert diver, and its activity is such that when hurrying from a distance to be fed in answer to the accustomed whistle, it realises its advantages under water, and frequently prefers to gain time by covering the intervening space by a succession of long dives. As to diet, although it may occasionally be seen to take a minute quantity of grain with the surface feeders or a little hemp seed with an ailing bird, it eats freely of and lives entirely upon a similar fare to the Eider Ducks, and on diving into deep water for food it is noticeable that it affects a spiral course. Particles of food less than a minnow are usually swallowed below, while larger pieces are brought to the surface and vigorously shaken until the desired size and consistency is acquired. The bird eats rapidly and rather greedily, and usually concludes a meal by bathing, which process being somewhat peculiar in itself, I shall attempt to describe. First for a few feet the bird shoots or threads its way in or out of the water just beneath the surface, accompanying each or at any rate the last appearance with a splash, after which it partly raises and shakes its wings in the ordinary way, but finally ends by preening its breast feathers when sitting perpendicular in the water, an attitude that it appears able to maintain for several seconds by paddling with the feet. With other birds it appears inoffensive and retiring, so much so that it greatly dislikes being mixed in a crowd; also I have omitted to add that this bird is, for a diving duck, during the summer months a most enthusiastic and untiring fly-catcher, and is almost duckling-like in the manner in which it zig-zags a course along the surface, cleverly snapping a fly at every twist. (April 1911.)

“Since writing the above we have been singularly fortunate, through the kindness of Mr. Hugh Wormald, in securing as a mate for the duck Longtail, a beautiful and adult male. This bird was received almost direct from the Dutch catchers on January 12th of the present year. It reached here (East Yorks) in perfect condition, and from the first proved like the female, and in contrast to such other newly caught sea ducks as I have acclimatised, a ready feeder and an easy subject to establish. As to food, from the day of its arrival it took greedily to pieces of fish, bullock's liver, or rabbit's flesh; in fact, its natural tameness and eagerness for food was such that on being liberated on a small pond it dived immediately and continuously for food thrown from the hand, while about three weeks later, on being transferred to a piece of water of nearly two acres in extent, it would from a distance of quite 150 yards come noisily flapping along the surface to meet one, and on arriving at close quarters show further proof of its confidence by attentively watching the hand, and with gaping bill actually leap into the air and endeavour to intercept fragments of food before they reached the water. Regarding this bird's behaviour with the duck at first he appeared almost indifferent to her presence; soon, however (probably within a fortnight), they began to converse and associate together, while on the 23rd of March, or within three months of his probable capture, they were seen to pair. This they did to our knowledge two or three times within the next few days, and at the time of writing (April 30th) have for some weeks been swimming in company and have every appearance of nesting. Concerning this drake's attitude towards the males of other species, he is not at all aggressive or as continually noisy as I have heard the wild bird represented to

be ; this is undoubtedly caused by no lack of health or good spirits, for except when fed up a more lively and energetic little duck I never saw, but is probably the result of the bird being alone, that is to say, out of sight and hearing of other males of his own kind, so there is no other bird that he is inclined to challenge or look upon as a rival. The first indications of the summer change of plumage in our bird commenced on March 24th by a small dark patch about the size of a pea appearing at the base of the upper mandible. This rapidly spread in the form of a continuous band of perhaps a quarter of an inch in width up the centre of the forehead until at the end of a week it nearly reached the crown. Meanwhile, or about six days after the first appearance of this basal patch, specks of colour began to appear in the white of the neck, breast, and shoulders. From this date the change progressed apace, and I have notes to the effect that most of the beautiful scapulars were cast on April 4th, and that the whole transformation was completed in May."

Unfortunately both Long-tailed Ducks died in the summer of 1911, which was one of unusual heat. Mr. St. Quintin thinks that they may have died of sunstroke.

HARLEQUIN DUCK

Clangula histrionica (Linnæus)

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Cosmonetta histrionica (L.), Kaup Natürl. Syst., p. 196 (1829), and Cat. Birds Brit. Mus., xxviii. p. 395 (1895); Dresser, B. of Eur., vol. vi. p. 609 (1871-1881).
Fuligula histrionica (L.), Nutt. Man. Orn., U.S. and Canada, ii. p. 448 (1834).
Harelda histrionica (L.), Keys and Blas., Wirbelth. Eur., p. 87 (1840).
Phylaconetta histrionica (L.) Brandt, Mem. Ac. St. Petersb., vi. p. 9 (1849).
Clangula torquata, C. L. Brehm, Vogelfang, p. 385 (1855).
Histrionicus histrionicus (L.), G. R. Gray, List. Gen. and Sub. Gen. Birds, p. 124 (1855).
Clangula histrionica (L.), C. L. Brehm, Vogelfang, p. 385 (1855).
Histrionicus torquatus (Brehm), Bp. Compt. Rend., xliii. p. 651 (1856).
Bucephala histrionica (L.), Gray, Hand-b. of B., iii. p. 87, No. 10,700 (1871).

LOCAL NAMES.—Harlequin, Collar-duck, Lord (male), Lady (female), the Dusky and Spotted Duck, the Little Brown and White Duck (Edw., *Nat. Hist. Birds*, 1747 and 1750) (*English*); Canard à Collier de Terre-neuve, La Sarcelle brune et blanche (Buffon); Canard histrion (*French*); Kragenente, Harlekinente (*German*); Strömand, Harlekingsand (*Danish and Swedish*); Tornaniarsak (*Greenlandic*); Straumönd, Brimdufa, Brimönd, Harlekong (*Icelandic*); Tschernaja polossataja utka (*Russian*); Brimondt (*Faroese*); Virta-alli (*Finnish*); Tornaniarsuk (*Greenland Esquimaux*); Shinori-gama (*Japanese*).

Egg.—From 7 to 10 in number; four nests found by myself at Myvatn, June 1891, contained 7, 7, 8, 8 eggs; texture of shell, smooth; shape, oval; colour, rich cream; size, "from $2\frac{9}{40}$ by $1\frac{12}{40}$ to $2\frac{16}{40}$ to $1\frac{25}{40}$ inch" (Dresser). Jourdain gives 5 to 10 as the number, and usually 6 to 8, with the shape elliptical or short oval, and the shell hard and only fairly glossy and smooth. The same authority informs me that the eggs vary from creamy-yellow to pale yellowish-brown or pale cinnamon-buff. Average size of 60 eggs 57.61×41.74 mm.; maxima, 61×42.5 and 59.44 ; minima, 52×39 and 54×38.7 mm. (F. C. R. Jourdain). Average weight, 3.523 gr. (3.21 to 4.08 gr.) (Rey); 3.40 gr. (Gobel).

Down.—Larger than that of most ducks, with individual sprays with a diameter of $1\frac{3}{8}$ inch (Pearson, *Ibis*, 1895, p. 244); colour, greyish-brown, with light greyish-white centres. The down is lighter than either Scaup or Scoter (Jourdain).

Young in Down.—Crown, lores, nape, thighs, and whole of the upper parts, dark brown with a greyish tinge. Cheeks, chin, throat, and under parts, white; a white spot over and somewhat in front of the eye, and on each side of the back and over the thighs;



HARLEQUIN DUCK

Adult male and female.

front of the wing margined with white; legs and feet, brown below and stone-grey above; webs, blackish; bill, dull lead-blue with nail inclined to bone colour.

Immature Male.—In first plumage in October the young male closely resembles the adult female, but can readily be recognised by the worn tips of the tail, less white on the breast, and the colour and form of the head and neck feathers. The flanks of the young male also are slate and not rich brown as in the adult female. Head and neck, slatey-blue, turning to brown on the lower neck, with a pure white spot on the ear-coverts; there is a white patch in front of the eye ribbed with dark brown; the spot over the eye is also well speckled with brown; the whole of the under parts are pale brown evenly ribbed with white edges to the feathers; all the upper parts except the worn tail similar to adult female. Towards the end of November the young male begins to assume the adult dress rapidly; the tail and tail-coverts are replaced by adult feathers; a tinge of burnt sienna appears on the long flank feathers; the wing-coverts, the scapulars, mantle, and the whole of the adult feathers on head and neck come in, so that by the end of January a young male in my possession is almost like an adult, except for the smaller black and white bars on the sides of the chest, a brown rump and bill, moulted and immature under parts, and immature wings.

The change then proceeds very slowly. From specimens in Mr. Schiöler's collection it is clear that the male Harlequin follows the same course of plumage as the Long-tailed Duck and the Golden-Eye. A greater or lesser part of the immature under parts are shed between the months of March and June, and the last signs of immaturity in the shape of the wings are not shed until late July or August, when the young male goes into an eclipse similar to the adult male. By September the new wings are obtained and the portions that were assumed as eclipse are being shed, so that it is not until November, that is, at fourteen months, that the young male stands in full dress.¹ It will breed in the following spring.

Adult Male.—A broad stripe of black from the point of the crown to the nape; on its lower edge from above the eye to the nape there is a broad band of burnt sienna; in front of the eye from the black crown to the gape is a wide equilateral space of white; chin and throat black; rest of the head, blackish-blue, becoming black below the eye and round the edges of the two white spots on the ear-coverts and immediately behind them; a broad white collar margined on both sides with black encompasses the lower neck, becoming very narrow when it meets the chest; chest, mantle, back, and inner scapulars blue-black; outer scapulars white, margined on the shoulders with blue-black passing into black. There is another broad band of white on the sides of the chest just in front of the wings which is also deeply margined with velvety black. Front half of flanks and under parts about as far as the vent blue black, having a brown tint over the whole of the lower region; latter half of the flanks rich burnt sienna; rump, under or upper tail-coverts, black with a bluish sheen; one white feather on the sides of the under tail-coverts; tail and primaries, brown black; secondaries, black richly glossed with purple; inner secondaries next to the wing-coverts, black glossed purple and edged with white; upper wing, brown edged with blue-black; sometimes a feather or two spotted with white in the centre; wing-coverts, white and margined with black and blue-black; long scapulars,

¹ The colours of these fourteen months males are never so rich as those of older birds.

dark brown and slate. Bill, deep lead-blue with bone-coloured nail; irides, rich red-brown; legs and feet, deep brown, sandy brown on inner sides of legs and toes; webs, blackish; length, 15 to 18 inches; wing, 8 to 8.5 inches; tarsus, 1.4 inch.

The Harlequin drake passes into a very complete eclipse plumage. Five old males shot by myself at Myvatn, July 2, 1891, had just commenced the moult, but were still, for the most part, in full spring dress. The eclipse proceeds slowly, and is not quite complete until September 1 (see Fig. 5). I examined the first specimen in eclipse in the collection of Mr. Coburn at Manchester in 1899, but the first examples of adult males in eclipse exhibited in this country were shown by Mr. Ogilvie Grant at a meeting of the B. O. C., December 14, 1910, and in the *Bull.*, vol. xxvii. p. 38, 39, he described the eclipse plumage. Shortly afterwards I received specimens from Iceland of a similar kind, and have recently examined the fine series in the collection of Mr. E. Lehn Schiöler, at Copenhagen. The whole of the plumage of the adult male in eclipse is a uniform dark slate-grey, the head and neck being somewhat darker, as well as the rump, under and upper tail-coverts, which are almost black; the single white ear-covert spot is retained, and the white space in front of the eye is dull-white, both these parts being edged with black; long scapulars, lower neck, upper and lower flanks, sooty-brown; about the end of August the wings and tail are shed (as usual only once). Like all the diving ducks, the male Harlequin is practically in a state of moult from July 1st until it reaches the full winter plumage early in October. A specimen in my collection (killed September 25, 1902) shows the last remnants of the eclipse disappearing. The final parts to change are the chin, throat, and neck, and these are being completely moulted.

Adult Female.—The whole of the upper parts are a dark brown, with an olivaceous tinge; crown and hind parts of the cheeks, slatey-brown; a white spot below the eye to the gape, and a white spot above the eye and on the ear-coverts, slightly speckled with dark brown; chin, greyish-brown; flanks, rich brown; wings and tail, blackish-brown, with a greyish tinge; under parts, brown edged with white, becoming nearly white over the lower breast; legs and bill similar to the male, only duller. Length, 15 to 17 inches; wing, 7.5 to 8 inches; tarsus, 1.3.

Immature Female.—There seems to be less difference between the young and adult female Harlequin than almost any of the diving ducks. Yet the immature female, prior to February, when the new tail is assumed, can always be recognised by the worn ends and lighter colours of the tail and under parts. The under parts are not nearly so broadly speckled as the adult, and there is a greater area of white. The flanks are greyer, and have a sandy tinge. Also the white spaces about the eye are always more heavily edged with slatey-brown.

By the end of March the difference is still less marked, but the young female always retains a considerable portion of immature feathers on the breast, lower parts, and flanks; as the summer proceeds the scapulars and wings look worn and faded. In August the full moult takes place, and the immature female becomes adult in October, when the winter plumage is fully assumed. Irides of immature female, dark brown.

BREEDING RANGE.—The Harlequin Duck is an inhabitant of the northern portions of both the Palæarctic and the Nearctic regions, being more common in North America than in Europe and Asia.



PLUMAGES OF THE HARLEQUIN DUCK.

1. Immature male; first plumage. Husavik, Iceland. Dec. 23rd, 1902. Age, 5 months and 23 days.
2. Immature male. Sydney, Nova Scotia. Nov. 10th, 1902. Age, 4 months and 10 days.
3. Immature male. Husavik, Iceland. Jan. 23rd, 1903. Age, 6 months and 23 days.
4. Immature male; just commencing to change into eclipse. July 2nd, 1910. Age, 11 months and 2 days.
5. Adult male; full eclipse. Husavik, Iceland. Aug. 30th, 1910.
6. Adult male; changing from eclipse to winter plumage. Husavik, Iceland. Sept. 25th, 1902.
7. Adult male; full winter-spring plumage. Sydney, Nova Scotia. Nov. 10th, 1902.
8. Adult male. Husavik, Iceland. Nov. 19th, 1910.
9. Immature female. Husavik, Iceland. Dec. 23rd, 1902. Age, 6 months and 23 days.
10. Adult female. Husavik, Iceland. Feb. 10th, 1903.

*Europe:*¹ *Iceland.*—Except on glacial streams and slow-running rivers, it is not an uncommon resident (Slater, *Manual*, p. 68). I found the species numerous on the lower Skalfandi Laxa, in the Myvatn district, and on the Sog river in S.W. Iceland. Neither in the centre of Iceland nor in the south did I observe the species, but it is said to be fairly common on the east and north coast rivers near the coast. It nests generally under bushes or in thick sedge or holes in river banks, close to the waters of some swift-flowing river. Sometimes in small colonies on islets (Jourdain).

Asia.—"In northern parts of E. Siberia, commonly from L. Baikal to Saghalien and Kamtschatka, north to about 65° N. lat., while he met with the birds in the Verkhoyanski mountains and the upper Kolyma basin" (H. E. Dresser, quoting S. A. Buturlin, in *Eggs of B. of Europe*, p. 575). It also breeds abundantly on the Kurile Islands (Stejneger, No. 71).

N. America: Greenland.—H. Saunders says it is most common between lat. 62° and lat. 65° N., becoming rarer to the northward. It is a common breeding species in West Greenland in summer, as Mr. E. Lehn Schiöler has received many specimens of adults and immatures. According to Winge it breeds at Godthavn, Vestfjord, and many other places. The species was not observed by Mr. A. L. Manniche in N.E. Greenland; but two Icelanders, who had been hunting polar bears on the east coast about the same latitude as Iceland, told me that they had seen this duck there in summer.

The Harlequin breeds on the continent of N. America from N.E. Labrador (Hantzsch, *J. F. O.*, 1908, p. 341) across the fur countries to Alaska (Nelson and Turner) and the Aleutian Isles, being abundant in Ungava and Hudson Bay. It works far south into northern Canada by means of the lake and river systems, and is plentiful in central Keewatin as far as Great Bear Lake (Melville, Spreadborough, &c.), and along both sides of the Rocky Mountains. I observed numbers of old and young birds making for the coast down to Stikine River, B.C., in October 1908. It breeds commonly throughout North British Columbia, but rarely on Lower Fraser (A. Brooks). It nests as far south as the Sierra Nevada (lat. 38°), and in Northern Montana, U.S.A. (Coues, *Birds of Dakota and Montana*, p. 653).

Professor D. G. Elliot found a brood of eight or nine in July 1879, near Wenatchee, Washington, and secured two of the birds, and it is somewhat remarkable that this northern duck should breed so far south as Calaveras County, California, where, according to Mr. L. Belding, several pairs nest every year on the Stanislaus River.

Reeks records this species as a common summer resident in Newfoundland, and C. H. Merriam (*Bull. Nuttall. Orn. Club*, viii. No. 4) says it is resident and breeding on the island, but in four journeys through the south and central portions of the island, undertaken between the months of July and November, I never once saw a Harlequin. My Indians, who knew all the birds well, were only acquainted with the Harlequin as a winter visitor to the west and south coast. It is probable, therefore, that as a breeding species it is only to be found in the northern peninsula and the N.W. and N.E. portions of the island.

MIGRATION RANGE.

Europe: British Isles.—There are twenty-two records of the Harlequin Duck in our islands, but there is little doubt that the majority of these are untrustworthy, whilst in many

¹ Sabanaeff's statement that it breeds in the Urals and the Government of Yaroslav is probably incorrect.

cases immature Long-tailed Ducks have been mistaken for this species.¹ Mr. Harting includes thirteen as possibly authentic. Robert Gray (*B. of W. of Scotl.*, p. 394) states that he wrote to Major W. Ross-King respecting an adult male which was killed in Aberdeenshire in 1858. H. Saunders (*Manual*, p. 457) thinks that the specimens figured by James Sowerby in his *British Miscellany* (1806) were probably obtained in Scotland. The best authenticated examples are the following: A male found dead by some fishermen on the shore at Filey, Yorks, in the autumn of 1862, and now in the collection of Mr. J. Whitaker at Rainworth, Notts. On December 2, 1886, three Harlequin Ducks were observed near the Farne Islands, and "two young males which were secured are, respectively, in the collections of Mr. R. W. Chase and the Rev. Julian G. Tuck" (Saunders' *Manual*, p. 457).

I can now add another record which I think is above suspicion. A fine adult male was killed near the Farnes in December 1882 by one Cuthbertson, and is now in the possession of Lord William Percy at Alnwick Castle, where I have seen it. Lord William Percy writes: "An old fisherman named Cuthbertson, who kept a public-house, and was clever at knowing birds, used always to go with me to the Farnes twenty years ago. He had many stuffed birds which he had shot himself in the neighbourhood, amongst others the Harlequin, which I desired to obtain, but which he was very proud of, and would not sell. He killed it near the Inner Farne, and knowing him well, I have not the smallest doubt of the truth of this statement. When he died his widow sold the bird to me in 1905."²

Iceland.—The species is indigenous and merely changes its habitat to the south of the island when Arctic conditions prevail in the north, but it undoubtedly stays in the north until late in November and even December, for I have received specimens from Husavik killed in these months. It has not been observed eastwards in Spitzbergen, Novaya Zemlya, nor in N. Siberia, and appeared to be extremely rare in Norway, since Professor Collett does not include it in his list of Norwegian birds. Specimens have, however, occurred on the coast in recent years, for there are examples both in the Bergen and Christiania Museums. To Sweden it is also only a very rare visitor. Two were taken at Claëstorp in Ö. Vingåker (1862), and near Carlskrona in 1893 (Westerlund, Pl. II. p. 181); one said to have been shot in the Tyrol in 1852 (M. Tschusi); two young birds killed 2nd March 1902 in Venetian estuary (Arrigoni, *Manuale*, p. 753).

Switzerland.—One shot on L. Lemán (3) September 12, 1865 (Saunders); also on Lakes Morat, Zurich, and Constance, and several in Germany (Naumann, *Vögel. Mitteleuropas*, x. p. 214).

Asia.—Said to occur on the lakes of the Orenburg government and South-west Siberia; also on Lake Baikal, south-west shores of Lake Baikal and Bureja Mountains (Radde); commoner on Upper than Lower Amur (v. Schrenck); Stanovoi Mountains and Manchuria (von Middendorff).

¹ Mr. J. H. Gurney in *Rambles of a Naturalist* (p. 263) criticises these records. "Eight are clearly mistakes," he says, "and the rest are all doubtful except two, these being the original Lewes specimen and the recent Aberdeen one."

² Mrs. Cuthbertson in a letter to me confirms the above fact, and states that her husband shot the bird thirty years ago, and that it had not left his possession during his life. Mr. G. Bolam has published his book on the *Birds of Northumberland* since the above was written. He says the bird owned by Lord William Percy was killed on December 2, 1886. He also states that there were three together, and that the two others are the specimens in the collections of Messrs. Chase and Tuck. He records all as *immatures*, and states that he saw the specimen now in the Percy collection when it belonged to Cuthbertson. This is a mistake, for the bird in question is a fine adult male.

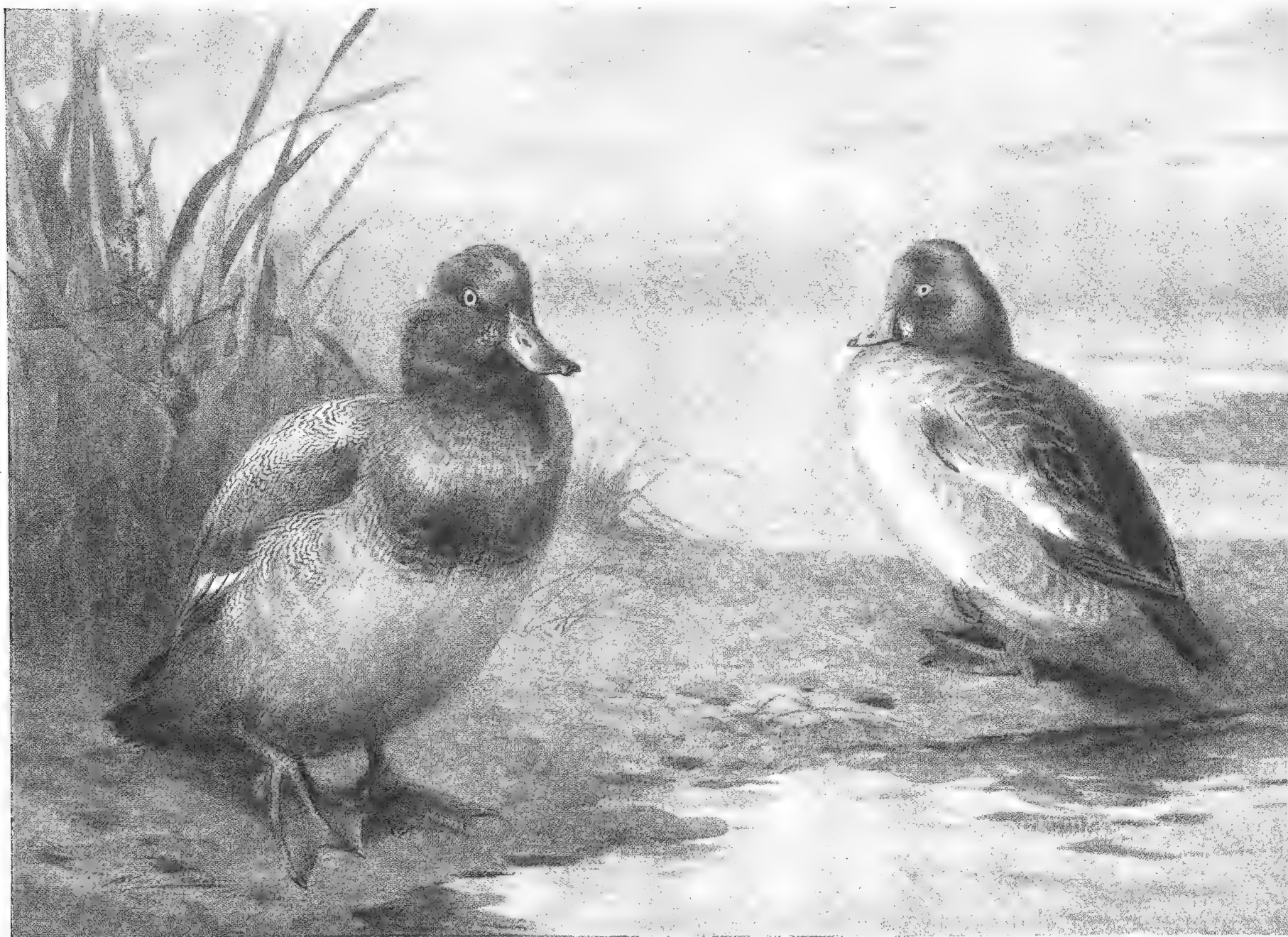


LONG-TAILED DUCK

Adult male, full eclipse.

HARLEQUIN DUCK

Adult male in eclipse.



SCAUP DUCK

Adult male in eclipse.

GOLDEN-EYE

Adult male in eclipse.

Japan.—Kuriles, Seebohm (*Birds Jap. Empire*, p. 254).

Corea.—*P. Z. S.* 1887, p. 591.

Commander Isles.—Occurs at all seasons, but does not breed (Buturlin).

N. America.—On the east side of North America the Harlequin Duck is abundant in late autumn and winter along the coasts of S. Labrador, S. and W. Newfoundland, New Brunswick, Nova Scotia, and Maine. Southwards it is rare in New Jersey and Massachusetts. In the interior it also occurs rarely in Western New York, Minnesota, Wisconsin, Illinois, Missouri, whilst Colorado seems to be the southern limit in Central N. America. On the Pacific side it winters in large numbers all the way from the Aleutian Islands to Monterey in California, being particularly abundant on the British Columbian coast, as well as on many open rivers and waters of the interior.

These birds probably do not winter to the east of Greenland, but stay through the winter on West Greenland.

HABITS.—The migratory habits of this beautiful duck seem to be somewhat weak, which would account for its scarcity on the coasts of Britain and Continental Europe. In all cases where it is possible they remain in the vicinity of their circumpolar home, and for the most part only move comparatively short distances to the seas and estuaries and swiftly flowing rivers that are not frozen in winter. This is certainly the case in Iceland, Greenland, Hudson Bay, and Alaska, and even those that winter far to the south are for the most part birds that have bred in more southern latitudes.

In winter the Harlequin Duck is, generally speaking, an inhabitant of the sea, and even in the breeding season they seldom go very far from it except to pass up large or small swift-flowing rivers, down which they can lead their young in the autumn. In summer they love to frequent swift-flowing rivers, but not glacier streams, especially where there are rocks and waterfalls. The foot of a waterfall where the white water is churned up amid a mass of rocks, and in places that it would seem even a duck could hardly live, are the favourite resorts of this species, and here they dive, feed, or sit on the rocks or crouch behind them the whole day long if undisturbed, only flying swiftly up and down the streams in the morning and evening. In October they all head down stream to the sea, where they assemble sometimes in large flocks, and pass the winter in much the same fashion as the Golden-Eye.

The beautiful markings of the male of this species are only noticeable when the observer is close at hand, so that they are not the easiest duck to identify except when in flight. The flight, at first somewhat laborious, is very rapid. The short, pointed wings are beaten swiftly, and the bird constantly swings from side to side, even more frequently than the Long-tailed Duck. The elevation is moderately high, performed at an altitude similar to the Golden-Eye, but when passing up or down stream it zig-zags and turns, to accommodate its line to every bend of the stream, however slight. The Harlequin never thinks of cutting off corners, and it would seem that it imagines its life depends on keeping exactly over the water, however much it bends or twists. I have seen Harlequins fly religiously above a bend in a stream that formed almost a complete circle in its course, and yet the birds did not cut across it to shorten their route.

In swimming they move the head and neck with every stroke of their powerful legs, and sit somewhat low in the water. When first arriving at the breeding grounds in flocks in early May they are very restless, constantly flying to and fro, whilst the females utter

their usual call of "Ek-ek-ek-ek," to which the males respond with a low or hoarse "Hu" or "Heh-heh." These calls they also frequently make in winter, and I have heard single females uttering their cry constantly when flying, as if they had lost their companions and were seeking them. When they are paired both sexes utter a different note, "Gi-ak," and this note is used at all times when the pair meet, until the males leave the females at the end of June. Mr. Hantzsch is, I fancy, the only ornithologist who has witnessed the courtship of this duck, and I append a literal translation from his notes:—

"In the second half of May the birds swim up stream to their breeding islands. The pairs keep faithfully together, but they are also unfaithful with others of their kind. The male often swims round his mate uttering an enticing 'Gia,' and at the same time rears up its short and strong neck, and at the same time bristles up the feathers on the head, which is considerably thickened by hard, blackish swellings of the flesh in the upper and hinder parts.

"The female answers rather more gently with the same call. At the same time the birds bow to one another, an attitude they also adopt when swimming. When danger threatens they call as a warning a gentle 'du' or 'dā,' and when flying away they utter at times a frightened 'Gag-gag-gag.'"

In searching for its food in the sea, the Harlequin Duck shows as much skill in diving in rough places as the Long-tailed Duck. It seems to prefer the vicinity of breakers and swirling eddies, and never seems at fault in such dangerous places. In summer they may generally be seen diving under waterfalls, often so close to the crashing torrent that their dusky forms are lost in the clouds of spray, and you wonder how such small bodies can live amid such a maze of strife. Yet time after time they emerge just on the lip of hundreds of tons of falling waters, and seem in no sense alarmed or put about even if suddenly whirled fifty feet by coming up too much in the stream. When you first see Harlequins on feed in such places you expect to see some catastrophe, but after the sight has become familiar and nothing happens, you regard it as a matter of course that the little duck knows all there is to be known about currents and falling bodies. Nearly all their food is obtained from the bottom of the sea or river, and they live chiefly on worms and bivalvular *conchilia*, crabs, crayfish, small fish, fish spawn, insects, and water plants. Faber found in the stomachs of birds he dissected in Iceland, *Nerita*, *coucer pulex*, and various water plants.

Mr. L. M. Turner gives an account (*Contrib. Nat. Hist. Alaska*, pp. 134-5, 1886) of this species in its Alaskan home. He says:—

"This pretty duck is not common in the immediate vicinity of Saint Michael's. South of that place it becomes more numerous, and extremely abundant around all the Aleutian Islands. It prefers the rocky places, exposed reefs, and shallow gravelly banks that are alternately covered or left bare by the sea. The food of this duck is of an animal nature. Shell-fish of all kinds do not come amiss, the common black mussel (*Mytilis edulis*) being its favourite food. These mussels are everywhere abundant on the rocks that are not exposed to too great a swash from the sea. Among the coves and small indentations of the sea, especially if in the neighbourhood of small islets, these ducks are to be found in great numbers. They dive after the mussels, and are frequently caught by the shell-fish and held until the former are drowned and cease their struggles, upon which they are released. This bird is not at all shy. They are, in the middle of winter, usually found singly or in small flocks. At this season they will even separate their ranks to allow a canoe to pass between them, or else fly a few yards and again settle. They usually are near the shore, searching the shallow, pebbly places for food when the surf is high. When a breaker comes over them they dive until it passes. At Attu I have seen them dive before a breaker struck them, and in such shallow water that I often wondered how they held on, as they came up at times not a foot from where they went down. They have a peculiar whistle for a note, and in the mating season, early in March, they assemble in larger flocks (sometimes as many as twenty or thirty

individuals form a flock); they then constantly utter this whistle as they chase each other over and through the water. Several males will attend one female during this season until she selects her choice. During the breeding season I have seen three males with one female."

In the early part of May or end of April Harlequin Ducks are already paired on the sea-coast of North Iceland, and move first to the estuaries and then up the rivers to their breeding places. Like all these diving ducks, the pair are much attached to one another, and if one is shot the other will stay by its fallen comrade and attempt to make it move by pushing it with the bill. Fortunately, however, in Iceland there is no shooting in the spring as there is in Greenland and Arctic Canada amongst the Esquimaux and Indians. Moreover there are in all these far northlands many hundreds of square miles where the Harlequins breed and the foot of man never treads, so that these beautiful birds are in no danger of extermination.

The Harlequin Duck makes her nest generally close to the bank of some swift-flowing river. Sometimes it is placed in holes in the bank or cracks in the lava, but more often under bushes of wild angelica, in tufts of *Empetrum nigrum*, dwarf willow, or coarse sedge and vegetation. Another favourite nesting place is an islet in the middle of a swift river, and Mr. Jourdain found quite a colony of Harlequins breeding in such a place in June 1912. He says: "We estimated that some seventeen pairs must have been nesting on one small island. About twenty birds were seen in the water just under the lee of the island, and all but two or three were males. Now and then we saw a pair. In one case we saw a female come out of a hollow, and she was immediately joined by a male, and the two went up stream together, swimming, diving, and sometimes walking when the water was quite shallow."

H. J. and C. E. Pearson thus describe (*Ibis*, 1895, p. 244) the nesting places of this duck in the Myvatn district, Iceland:—

"This species breeds latest of all the duck; our first eggs were taken on July 1st, and on the 18th of July fresh eggs were still being brought to us. The nest is generally placed at a distance of under two yards from the water, which is preferably a quickly flowing river. H. J. Pearson visited some islands in a river on July 11th, and this river was the remainder of an old lava stream. The lava had formed a dam across the river, which was later broken through and four channels formed, and the water in these flowed like a mill-stream, so that it was difficult to cross it even with Iceland ponies. There were six nests with eggs on these islands, three of them only two-thirds of a yard distant from the water under the leaves of wild angelica, the others, in holes in the bank near the water, were sheltered by a screen of overhanging plants. Most of the nests contained very little down, although the eggs were almost hatched. The down of these duck is very much coarser (larger) than that of any other species taken by us, for separate feathers have a diameter of 34.8 mm. There were many old nests, too, in these cavities, which proves that these islands have for years been a favourite breeding place. Our dog, on the 9th of July, scared a duck from its nest containing seven eggs about ten metres from the water and placed under a clump of birch, but we are convinced that this is an unusual distance from the water. Flocks of more than thirty males were often seen together, and afforded a fine sight; some sat on the rocks, others swam in rapids which would suit few other birds."

Riemschneider also gives us (*Ornith. Monatsschr.*, 1896, p. 313) a very pleasant and accurate picture of the Harlequin in describing its movements and breeding habits. He says:—

"This is the finest of all the species here. Their movements both on land and water are quick, skilful, and graceful; they run swiftly on dry land, and their gait reminds one very little of the waddling

of other duck, but in walking the small head with its beautiful beak is stretched rather forward, and the long tail pointing downwards, with the proportionately slender body and the peculiar colouring, all give this bird a rather foreign appearance, though certainly not an unlovely one. The plumage of this small duck charmed me particularly when I saw it swimming up stream with unparalleled swiftness through the frothing foam of the Laxa, winding about through the eddies of the strongest breakers, and making use of the quieter places in the most skilful way. I then always had in mind the other much less common Icelandic name *Brindufa* (Breaker Dove). I have never seen the Harlequin Duck make an even temporary stay on the lake, but they always keep to the swiftly flowing rivers of the neighbourhood, e.g. on the Laxa, where I visited a small breeding colony near the Helluvad farm. When I came to this place on June 24th I was several times obliged, in order to reach the nests, to ride through the water of the river to a series of small heath-overgrown rock islands upon which the duck breed. Here I found, in addition to several nests of the *Fuligula marila*, four nests of the *F. histrionica*; it is certain that there were still more nests to be found close to. I put the number of pairs nesting at this place at from ten to twelve. The first nest, standing under a thick clump of heath, had a sort of bank of dry heath round the shallow hollow of the site of the nest. This hollowed-out basin contained the first half-finished lining of grey down mingled with fine dry grass. In the nest lay five eggs, which I took away, and which proved not to have been sat on at all. This nest had been hitherto untouched by human beings, but not so the others which I saw, and which had already lost some of their eggs. The next nest showed exactly the same construction, and in this the down lining was still altogether wanting. This one contained only two eggs. While the two first nests we have just described were some paces from the edge of the island, the next, unprotected by heath growth, was placed on a small piece of rock jutting out over the river. The basin contained a complete lining of grey down mixed with grass, and the loose edge of this was carefully pulled down over three eggs which were in the nest. The duck flew away from the fourth nest which I visited as soon as I was quite close to it, and this one again was placed more in the middle of the island under a clump of heath, and was very plentifully lined with down with an unusually small admixture of parts of plants; it contained three eggs. The eggs of the *Histrionica* are very bulging, and of very regular and uniform shape; the shell is smooth, but has no sheen; the colour is pure yellow-white; on the eggs found in the nest there were some red almost effaced spots and streaks, blood colour, probably caused by parasitic insects. The diameter of the eggs to be found in my possession is as follows: 59 × 44, 59 + 43, 58 + 43, 59 + 43.5, 49 + 43 mm."

Coarse stalks, leaves, and vegetable matter form the basis of the nest, which is as a rule only roughly put together.

The female lays from 5 to 10, usually 6 to 8, creamy-yellow to pale yellowish-brown or cinnamon-buff eggs, with a dull but smooth surface. In shape they are elliptical or a short oval. The down with which she lines the nest is larger than that of most ducks, individual sprays having a diameter of $1\frac{3}{8}$ in. (Pearson, *Ibis*, 1895, p. 244). In colour it is greyish-brown with light greyish-white centres, and is lighter than either the Scaup or Scoter. Since Harlequins arrive somewhat late at the breeding grounds, the nesting season is also slightly later than with other species. It is unusual to find full clutches until the second half of June. Incubation is by the female alone, as with other ducks, and is said by Hantzsch to be $3\frac{1}{2}$ weeks, whilst Mr. Barnby Smith, in the *Avicultural Mag.* (1909, p. 58), says it is said to be longer than with other ducks. It is presumed that the young are at first fed by the old bird direct from the bill, as newly hatched young always hold their bills upwards to the beak of the foster parent, and will not at first pick up food for themselves (*Avicultural Mag.*, 1909, p. 58). At first the food is principally the larvæ of *Ephemera* (Slater). The down period of the young is said by Faber to be about forty days.

I noticed that in the last week in June all the adult male Harlequins had deserted the females, and were to be seen in small parties of five to ten in shady places near to waterfalls



COURTSHIPS OF VARIOUS DIVING DUCKS.

1. TUFTED DUCKS IN FULL SHOW. 2. SCAUP.
3. HARLEQUIN DUCKS. 4. LONG-TAILED DRAKE DISPLAYING IN FLIGHT.
5. LONG-TAILED DUCKS CALLING.

and generally about rocks. They had not yet assumed any of the eclipse plumage externally, although when shot it was found to be coming in abundantly. Like nearly all male ducks in eclipse, the male Harlequins seemed to have some disposition to hide themselves at this period. Although tame, they crouched behind rocks, as if to escape observation, rather than take refuge in flight, and probably the knowledge that they would shortly be unable to fly and would have to keep out of danger becomes an instinct some time before the actual flightless period takes place.

The female Harlequins lead their broods down stream to the sea at the end of September, whilst most of the flocks assemble in October on the coast, and even in the north-east of Iceland they often remain there till December, when severe conditions force them to migrate to the south of the island. The flesh of the young bird before it goes to the sea is eatable, but not any better than immature Golden-Eye, whilst birds which I killed in Nova Scotia in November seemed very oily and rank, and quite unfit for human food.

There is no reason why this beautiful duck should not be kept by duck fanciers, but up to the present few eggs have been brought to this country. Recently, however, two of our most keen and energetic aviculturists—Mr. W. H. St. Quintin and Mr. Hugh Wormald—have made special efforts to obtain eggs and to rear these ducks from the egg, with the result that their efforts have met with some success. In 1910 Mr. St. Quintin obtained several eggs from Iceland, but they were so long delayed on the way that when set under hens only one duckling hatched. This, a male, was successfully reared at Scampston, and survived till the summer of 1911, when it died. Writing on December 19, 1911, Mr. St. Quintin, in describing the plumage, which is that of the normal young male of its age, says: "I notice that it always uses its wings half-opened when it dives. It stands on shore very erect. The short thick neck is very striking."

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